

## Curriculum Vitae\*

**Sameen Ahmed Khan, PhD**

*Assistant Professor*

Department of Mathematics and Sciences  
College of Arts and Applied Sciences (CAAS)  
Dhofar University

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Salalah, **Sultanate of Oman**, <http://www.du.edu.om/>.

[rohelaakhan@yahoo.com](mailto:rohelaakhan@yahoo.com), <http://www.scopus.com/authid/detail.url?authorId=8452157800>

<http://SameenAhmedKhan.webs.com/>

<http://sites.google.com/site/rohelaakhan/>, <http://www.imsc.res.in/~jagan/khan-cv.html>

### PERSONAL DATA

**Full Name:** Mr. Sameen Ahmed KHAN  
**Place of Birth:** New Delhi, INDIA  
**Nationality:** INDIAN  
**Marital Status:** Married. Blessed with a daughter, Hajira Khan

### ADDRESS FOR CORRESPONDENCE:

*Dr. Sameen Ahmed Khan*

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### CURRENT POSITION: *Assistant Professor*

Department of Mathematics and Sciences  
College of Arts and Applied Sciences (CAAS)  
Dhofar University  
Post Box No. 2509, Postal Code: 211  
Salalah

**Sultanate of Oman.**

### PREVIOUS POSITIONS: *Assistant Professor*

Engineering Department  
Salalah College of Technology (**SCOT**)  
Salalah  
**Sultanate of Oman.**

*Assistant Professor and Assistant Head,*

Department of Mathematics & Applied Sciences **DOMAS**  
Middle East College of Information Technology (**MECIT**)  
Technowledge Corridor  
Knowledge Oasis Muscat (**KOM**)  
Muscat  
**Sultanate of Oman**

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\*Updated on Friday the 07 July 2017. <http://SameenAhmedKhan.webs.com/>

**RESEARCH POSITIONS: CONACYT-UNAM** Post-Doctoral Fellow,  
(with Professor Kurt Bernardo WOLF)  
Centro de Ciencias Físicas  
Universidad Nacional Autónoma de México (**UNAM**)  
Apartado Postal 48-3,  
Cuernavaca, Morelos, **MÉXICO**  
(15 October 2001 - 13 October 2002)

**INFN** Post-Doctoral Fellow,  
(with Professor Modesto PUSTERLA)  
Dipartimento di Fisica Galileo Galilei, Università di Padova  
Istituto Nazionale di Fisica Nucleare (**INFN**)  
Sezione di Padua/Padova, **ITALY**  
(27 October 1997 to 26 October 1999)

Junior Research Fellow (JRF)  
The Institute of Mathematical Sciences, (**IMSc/Matscience**),  
Chennai (Madras), **INDIA**,  
(August 1991 to July 1997).

**CAREER OBJECTIVE:**

**Faculty Member** in Departments of Physics or Mathematics in Universities, Institutes of Technology or Engineering Colleges, with teaching and research in Physics OR/AND Mathematics.

**TEACHING EXPERIENCE**

- **Full-time Lecturer:**  
Salalah College of Technology, SCOT, May-2006 to Present.  
Middle East College of Information Technology, MECIT, September 2003 to May 2006.
- **Teaching:**  
Two-Semester Sequence of Physics for Engineering;  
The Three-Semester Sequence of Engineering Mathematics (Foundation Mathematics, College Mathematics, Calculus with Numerical Methods and Advanced Calculus) and  
The Two-Semester Sequence of Physics (Physics, Engineering Mechanics and Engineering Physics).

**OTHER ACTIVITIES**

- Drafted the syllabus for the new BS Programme.
- Set up the Department Homepage on the College Intranet, which contains the in-house prepared *Lecture Notes* and *Question Banks*, meeting most of the requirements of all the courses offered by the department.
- **Mathematics Olympiad**  
I was part of the three-member team, which jointly conducted the *first* Mathematics Olympiad in the College, on Wednesday the 26th May 2004. The other two members of the team were my Colleagues from the Department, Ms. Lavanya Venkatesan and Ms. Usha Ramanathan. The second Olympiad was conducted on Tuesday the 21 March 2006. These events are now evolving into a National Olympiad with the first *Intercollegiate Mathematics Olympiad* held on Sunday the 07 May 2006, during the Intercollegiate Meet, **QUEST** (6-8 May 2006, <http://www.mecit-quest.com/>).
- **Served on several College Committees:**  
*Disciplinary Committee, Journal Committee, Library Committee, Web-Site Committee, Prizes and Awards Committee, Accreditation Steering Committee, Time Table Committee, Examination Committee, E-Learning and Library Committee, Moderation Committee, Staff Development Committee, Staff Research and Consultancy, Curriculum Review & Development Committee, Academic Journal Committee, Staff Handbook Committee, Student Induction Committee, Student Progress Committee and SCT Eco Club (Environment).*

**EDUCATION:**

<b>B.Sc. Honours (Physics)</b>	1988, Osmania University, Hyderabad
<b>M.Sc. (Physics)</b>	1990, Indian Institute of Technology (IIT), Kanpur
<b>Ph.D</b>	1997, The Institute of Mathematical Sciences, Chennai (Madras)
<b>Title of the Thesis</b>	Quantum theory of charged-particle beam optics
<b>Description of Ph.D research</b>	Development of quantum mechanical treatment for the study of transport of charged-particle beams through electromagnetic systems
<b>Thesis Supervisor:</b>	Prof. Ramaswamy JAGANNATHAN

**Course Work:** The Ph.D programme consisted of regular course work over three semesters in Classical Mechanics, Quantum Mechanics, Electromagnetic Theory, Mathematical Physics, Differential Geometry, Group theory, Statistical & Thermal Physics, Quantum Field Theory, Quantum Optics and Particle Physics.

**Skills:**

**Spoken and Written English,** Proficient; used as the medium of instruction since kindergarten  
**Computers:** Familiar with Fortran, Mathematica, L<sup>A</sup>T<sub>E</sub>X, MS Office and Web-designing.

**MAIN FIELDS OF RESEARCH:** Physics of Beams: Particles & Photons

In particular, Applications of the classical and quantum theory of beam transport to various situations such as Accelerator Optics, Electron Microscopy, *etc.*  
 Helmholtz Optics and Maxwell Optics. A unified treatment of light beam optics and polarization.

**AWARDS & HONOURS:**

- **Mathematics Olympiads:**

Winner of the State Level Mathematics Olympiads at:

- Junior Level (1983),
- Senior Level (1985) and
- Degree (Undergraduate) Level (1986 to 1988).

(Conducted by **APAMT**: Andhra Pradesh Association of Mathematics Teachers).

- **Young Physicists Colloquium:**

Invited Lecture at the Young Physicists Colloquium, Kolkata (Calcutta), 22-23 August 1996,

**Beam optics of the Dirac particle,**

The Abstract Appeared in: *Physics Teacher*, Vol. **38**, No. 2 & 3, pp. 67, (April-September 1996). (Organized by **IPS**: The Indian Physical Society).

- **Reviewer and Referee:**

- Serving on the Board of Advisors, *RFID Association, India*.  
<http://www.rfida.org/>.
- Served as a Referee for several Peer-Reviewed Journals.
- Member of the Review Panel,  
*International Conference on Applied Information and Communications Technology*,  
 (22-23 March 2011 at MECIT, the Middle East College of Information Technology, Muscat, Sultanate of Oman). <http://www.mecit.edu.om/conf2011/>.
- The *Regular Correspondent* for the ICFA Beam Dynamics Panel Newsletters, for the regions of Middle East & Africa.  
**(ICFA:** International Committee for Future Accelerators,  
<http://icfa-usa.jlab.org/archive/newsletter.shtml>).

• **Biographical Listings:**

- **Who's Who Online**,  
<http://www.whoswho-online.com/whoshome.html>, (March 1998).
- **Asian/American Who's Who, Vol. II**,  
(Rifacimento International, New Delhi, India), pp. 367 (2002).
- **Asia/Pacific Who's Who, Vol. IV**,  
(Rifacimento International, New Delhi, India), pp. 290-291 (2002).
- **Reference Asia: Asias Who's Who of Men & Women of Achievement**,  
(Rifacimento International, New Delhi, India), pp. 191-192 (2004).
- **Asian/American Who's Who, 2005, Vol. IV**,  
(Rifacimento International, New Delhi, India), pp. 367 (2005).
- **Eminent Personalities of the World, Vol. I**,  
(World Biographical Research Foundation, Shri Vaishnavi Publishing, Nagpur, India), pp. ???  
(2005) (*in press*).
- **Distinguished & Admirable Achievers-2005**,  
(South-Asia (Intl.) Pub. Co., Delhi, India). pp. ??? (*in press*).

### PRESENT RESEARCH: A Summary

(For details see the PUBLICATIONS listed below)

**Quantum theory of charged-particle beam dynamics** is being developed essentially using an algebraic approach. On the basis of this theory, optics of the transport of nonrelativistic and relativistic charged-particle beams through electromagnetic systems (of importance for charged particle beam devices, like electron microscopy, microelectron-beam lithography, etc., and accelerator design) is being analyzed systematically. The machinery of Lie algebraic methods is used primarily and this facilitates an easy passage from the quantum theory to the traditional classical theory (geometrical optics). The results include the modifications of the paraxial properties and aberration coefficients, with  $\hbar$ -dependent contributions, for the various optical elements, like the magnetic round lenses, quadrupoles, etc., using the Schrödinger (nonrelativistic), Klein-Gordon and Dirac equations. For charged spin- $\frac{1}{2}$  particles, the Dirac equation leads to spinor contributions to the beam dynamics. We do hope that these quantum corrections, albeit small, would be of some practical significance in certain situations; it should, however, be emphasized that, in any case, it is certainly satisfying to understand the working of the traditional classical theory as an approximation of a proper quantum theory since after all any physical system is quantum mechanical at the fundamental level. The application of the spinor beam optical formalism has been shown to lead to a fully quantum mechanical understanding of the dynamics of a spin- $\frac{1}{2}$  particle with anomalous magnetic moment, including the spin evolution, at the level of single-particle dynamics. The general theory, developed for any magnetic optical element with straight axis, describes the the quantum mechanics of the orbital dynamics, the Stern-Gerlach kicks and the Thomas-Bargmann-Michel-Telegdi (Thomas-BMT) spin evolution.

The application of the Wigner phase-space distribution for studying the quantum mechanics of charged particle beam transport through electromagnetic optical systems provides a natural link between the classical and the quantum descriptions. In this context, the relation between the transformation of the Wigner function of a charged particle optical system, corresponding to the associated scalar wave function, and the transformation of the classical phase-space of the system has been studied.

In the paraxial régime of 3-dim optics, two evolution Hamiltonians are equivalent when one can be transformed to the other modulo scale by similarity through an optical system. To determine the equivalence sets of paraxial optical Hamiltonians one requires the orbit analysis of the algebra  $\mathfrak{sp}(4, \mathfrak{R})$  of  $4 \times 4$  real Hamiltonian matrices. Our strategy uses instead the isomorphic algebra  $\mathfrak{so}(3, 2)$  of  $5 \times 5$  matrices with metric  $(+1, +1, +1, -1, -1)$  to find 4 orbit regions (strata), 6 isolated orbits at their boundaries, and 6 degenerate orbits at their common point. We thus resolve the degeneracies of the eigenvalue classification.

### RESEARCH PLANS

Portions of my work are concerned with the applications of the above formalism and related ideas to various problems such as developing a complete quantum mechanical treatment of high energy polarized beams of Dirac particles (electrons, protons,  $\dots$ ), including polarization, radiation effects etc., studying the quantum mechanics of beam optical aberrations relevant for electron microscopy (from low voltage to high voltage regions) and microelectron-beam device technology,  $\dots$ , etc.

Using the analogy of the Helmholtz equation with the Klein-Gordon equation and the Pauli-Villars approach, a formalism utilizing the powerful techniques of quantum mechanics has been developed for scalar optics including aberrations. This provides an alternative to the traditional *square-root* approach and gives rise to wavelength-dependent contributions modifying the aberration coefficients.

Starting with the Dirac-like form of the Maxwell equations we build a formalism which provides a **unified treatment of beam optics and polarization**. The traditional results (including aberrations) of scalar optics are modified by the wavelength-dependent contributions. Some of the well-known results in polarization studies are realized as the leading-order limit of a more general framework of our formalism.

We are also studying the **Beam Halo Problem** and building a diffraction-based model for the beam losses. In the proposed model we use the machinery of the *Quantum-like* approaches. We are also trying to analyze the bulk characteristics of beams using the powerful techniques of **Statistical Mechanics**.

### Expected Outcome of the Proposed Research Plan

Any physical system is quantum mechanical at the fundamental level. So, the proposed research would lead, first of all, to a better understanding of the quantum physics of beam dynamics. Besides this, of course, the results should lead to some insight into the solutions of some of the practical problems of beam dynamics; in the polarization analysis, for example. One immediate result shall be the generalization of the 'beam-optical' form of the Thomas-BMT equation to *all* orders. In our earlier paper the leading order approximation leads to the paraxial beam-optical form of the Thomas-BMT equation.

The preliminary results of the proposed halo model are encouraging and further work is in progress.

## PATENTS

**Quadricmeter** is the instrument devised to identify (distinguish) and measure the various parameters (axis, foci, latera recta, directrix, etc.,) completely characterizing the important class of surfaces known as the quadratic surfaces. Quadratic surfaces (also known as quadrics) include a wide range of commonly encountered surfaces including, cone, cylinder, ellipsoid, elliptic cone, elliptic cylinder, elliptic hyperboloid, elliptic paraboloid, hyperbolic cylinder, hyperbolic paraboloid, paraboloid, sphere, and spheroid. Quadricmeter is a generalized form of the conventional spherometer and the lesser known cylindrometer (also known as the Cylindro-Spherometer). With a conventional spherometer it was possible only to measure the radii of spherical surfaces. Cylindrometer can measure the radii of curvature of a cylindrical surface in addition to the spherical surface. In both the spherometer and the cylindrometer one assumes the surface to be either spherical or cylindrical respectively. In the case of the quadricmeter, there are no such assumptions.

- Sameen Ahmed Khan,  
**Quadricmeter**,  
*Official Journal of the Patent Office*, Issue No. **43/2008**, Part-I, pp. 25296 (24 October 2008).  
Application No.: **2126/MUM/2008 A**, International Classification: **B69G1/36**,  
Controller General of Patents Designs and Trade Marks, Government of India.

[http://ipindia.nic.in/ipr/patent/journal\\_archieve/journal\\_2008/patent\\_journal\\_2008.htm](http://ipindia.nic.in/ipr/patent/journal_archieve/journal_2008/patent_journal_2008.htm)

[http://ipindia.nic.in/ipr/patent/journal\\_archieve/journal\\_2008/pat\\_arch\\_102008/official\\_jour](http://ipindia.nic.in/ipr/patent/journal_archieve/journal_2008/pat_arch_102008/official_jour)

<http://www.patentoffice.nic.in/>, <http://www.ipindia.nic.in/>

(*patent in process*, <http://SameenAhmedKhan.webs.com/quadricmeter.html>).

- Sameen Ahmed Khan,  
**Conicmeter**.  
(*patent in process*, <http://SameenAhmedKhan.webs.com/conicmeter.html>).

## PUBLICATIONS

### Contributions to International Reports:

1. ..., A. Sameen KHAN, ..., (*one of the 300+ Contributors, from 73 Institutions*),  
**Particle Physics Experiments at JLC**,  
*ACFA Linear Collider Working Group Report, KEK Report 2001-11* (August 2001).  
**JLC**: Electron-Positron Linear Collider Project.  
*E-Print arXiv*: <http://arXiv.org/abs/hep-ph/0109166/>.
2. ..., Sameen Ahmed KHAN, ..., (*one of the 500+ Contributors, from 121 Institutions*),  
**GLC Project Linear Collider for TeV Physics**,  
*KEK Report 2003-7* (September 2003).  
**GLC**: Global Linear Collider.
3. ..., Sameen Ahmed KHAN, ..., (*one of the 250+ Contributors, from 79 Institutions*),  
**GLD Detector Outline Document (GLD DOD)**,  
 GLD: A Large Detector Concept study for International Linear Collider for TeV Physics  
 Report of the  
 GLD Concept Study Group,  
 World Wide Study of Physics and Detectors for future Linear  $e^+e^-$  Colliders, (March 2006).  
**GLD**: Gaseous tracker based Large Detector.  
*E-Print arXiv*: <http://arXiv.org/abs/physics/0607154/>.
4. ..., Sameen Ahmed KHAN, ..., (*one of the 500+ Contributors, from 325 Institutions*),  
**International Linear Collider Reference Design Report**, (*Four Volumes*)  
 ILC Global Design Report and World Wide Study,  
 (August 2007).  
**ILC**: International Linear Collider.  
 (Digital Object Identifier (**DOI**), <http://dx.doi.org/10.2172/914731>).  
*E-Print arXiv*: <http://arxiv.org/abs/0712.1950/>, <http://arxiv.org/abs/0709.1893/>,  
<http://arxiv.org/abs/0712.2361/> and <http://arxiv.org/abs/0712.2356/>.
5. ..., Sameen Ahmed KHAN, ..., (*one of the Signatories*),  
 Letter of Intent (LOI), **The International Large Detector Letter of Intent**,  
 ILD Concept Group, International Linear Collider (ILC)  
 DESY 2009-87, FERMILAB-PUB-09-682-E, KEK Report 2009-6, (February 2010).  
 (Digital Object Identifier (**DOI**), <http://dx.doi.org/10.2172/975166>).  
*E-Print arXiv*: <http://arxiv.org/abs/1006.3396/>.
6. ..., S. A. KHAN, ..., (*one of the 2400 Signatories, from 408 Institutions*),  
**International Linear Collider Technical Design Report**, (*Five Volumes*)  
 ILC Global Design Effort (GDE), (Wednesday the 12 June 2013).  
**ILC**: International Linear Collider.  
 (Digital Object Identifier (**DOI**), <http://dx.doi.org/>).  
*E-Print arXiv*: <http://arxiv.org/abs/1306.6327/>, <http://arxiv.org/abs/1306.6352/>,  
<http://arxiv.org/abs/1306.6353/>, <http://arxiv.org/abs/1306.6328/> and  
<http://arxiv.org/abs/1306.6329/>.

**Lecture Notes:**

1. Sameen Ahmed Khan,  
*Lecture Notes in Mathematics*,  
Middle East College of Information Technology,  
Muscat, Sultanate of Oman (2005). <http://www.mecit.edu.om/>.  
The Notes cover the *Foundation Mathematics* and the Three-Semester Sequence of *Engineering Mathematics*, *College Mathematics*, *Calculus with Numerical Methods* and *Advanced Calculus*.
2. Sameen Ahmed Khan,  
*Lecture Notes in Physics*,  
Middle East College of Information Technology,  
Muscat, Sultanate of Oman (2005).  
<http://www.mecit.edu.om/>.  
The Notes cover the Two-Semester Sequence of *Physics* along with *Engineering Physics* and *Engineering Mechanics*.
3. Sameen Ahmed Khan,  
*Lecture Notes in Physics*,  
Salalah College of Technology E-Learning Website, <http://www.sct.edu.om/>, (2010).  
The Notes cover the Two-Semester Sequence of *Physics for Engineering*.
4. Sameen Ahmed Khan,  
*Physics Laboratory Manual*,  
Salalah College of Technology E-Learning Website, <http://www.sct.edu.om/>, (2010).  
The Notes cover over twenty experiments for the Two-Semester Sequence of *Physics for Engineering*.

**A. Books**

1. Sameen Ahmed Khan,  
**International Year of Light and Light-based Technologies**,  
LAMBERT Academic Publishing, Germany (Thursday the 30 July 2015),  
96 pages. <http://www.lap-publishing.com/>, <http://isbn.nu/9783659764820/>.  
**ISBN-13:** 978-3-659-76482-0 and **ISBN-10:** 3659764825.
2. Sameen Ahmed Khan,  
**Introductory Physics Laboratory Manual**,  
LAP LAMBERT Academic Publishing, Germany (Wednesday the 19 August 2015),  
168 pages. <http://www.lap-publishing.com/>, <http://isbn.nu/9783659771897/>.  
**ISBN-13:** 978-3-659-77189-7 and **ISBN-10:** 3659771899.
3. Sameen Ahmed Khan,  
**Objective Questions in Introductory Physics**,  
LAP LAMBERT Academic Publishing, Germany (Friday the 9 October 2015),  
408 pages. <http://www.lap-publishing.com/>, <http://isbn.nu/9783659786198/>.  
**ISBN-13:** 978-3-659-78619-8 and **ISBN-10:** 3659786195.

**B. Review Articles and Book Chapters**

1. R. Jagannathan and S. A. Khan,  
**Wigner functions in charged particle optics**,  
*in: Selected Topics in Mathematical Physics — Professor R. Vasudevan Memorial Volume*,  
*Editors:* R. Sridhar, K. Srinivasa Rao, and V. Lakshminarayanan  
(Allied Publishers, Delhi, 1995), pp. 308-321 (1995).  
(ISBN-10: 8170234883 and ISBN-13: 978-8170234883).



2. R. Jagannathan and S. A. Khan,  
**Quantum theory of the optics of charged particles,**  
*Chapter-4 in:*  
*Advances in Imaging and Electron Physics, Editors: P. W. Hawkes, B. Kazan and T. Mulvey,*  
(Academic Press, San Diego, 1996) **Vol. 97**, pp. 257-358 (1996).  
(ISBN-10: 0120147394 and ISBN-13: 978-0120147397).  
(Digital Object Identifier (**DOI**), [http://dx.doi.org/10.1016/S1076-5670\(08\)70096-X](http://dx.doi.org/10.1016/S1076-5670(08)70096-X)).
3. Sameen Ahmed Khan,  
**Wavelength-Dependent Effects in Light Optics,**  
*Chapter-6 in:*  
*New Topics in Quantum Physics Research,*  
Editors: Volodymyr Krasnoholovets and Frank Columbus,  
(Nova Science Publishers, New York, 2006, <http://www.novapublishers.com/>).  
pp. 163-204 (30 December 2006).  
(ISBN-10: 1600210287 and ISBN-13: 978-1600210280).
4. Sameen Ahmed Khan,  
**The Foldy-Wouthuysen Transformation Technique in Optics,**  
*Chapter-2 in:*  
*Advances in Imaging and Electron Physics, Editor: Peter W. Hawkes,*  
(Elsevier, 2008) **Vol. 152**, pp. 49-78 (August 2008).  
(ISBN-10: 0123742196 and ISBN-13: 978-0-12-374219-3).  
(Digital Object Identifier (**DOI**), [http://dx.doi.org/10.1016/S1076-5670\(08\)00602-2](http://dx.doi.org/10.1016/S1076-5670(08)00602-2)).
5. Sameen Ahmed Khan,  
**Number Theory and Resistor Networks,**  
*Chapter-5 in:*  
*Resistors: Theory of Operation, Behavior and Safety Regulations,*  
Editor: Roy Abi Zeid Daou,  
(Nova Science Publishers, New York, 2013, <http://www.novapublishers.com/>).  
pp. 99-154 (May 2013).  
(Hard Cover: pp. 99-154, ISBN-10: 1622577884 and ISBN-13: 978-1-62257-788-0).  
(ebook: pp. 99-154, ISBN-10: 1626187959 and ISBN-13: 978-1-62618-795-5).
6. Sameen Ahmed Khan,  
**Coordinate Geometric Generalization of the Spherometer and Cylindrometer,**  
*Chapter-8 in:*  
*Advances in Engineering Research, Volume 10,*  
Editor: Victoria M. Petrova,  
(Nova Science Publishers, New York, 2015, <http://www.novapublishers.com/>).  
pp. 163-190 (10 July 2015).  
(Hard Cover: pp. 163-190, ISBN-10: 1634827848 and ISBN-13: 978-1-63482-784-3).  
(ebook: pp. 163-190, ISBN-10: 1634828151 and ISBN-13: 978-1-63482-815-4).
7. Sameen Ahmed Khan,  
**International Year of Light and History of Optics,**  
*Chapter-1 in:*  
*Advances in Photonics Engineering, Nanophotonics and Biophotonics,*  
Editor: Tanya Scott,  
(Nova Science Publishers, New York, 2016, <http://www.novapublishers.com/>).  
pp. 1-56 (April 2016).  
(Hard Cover: pp. 1-56, ISBN-10: 163484498X and ISBN-13: 978-1-63484-498-7).  
(ebook: pp. 1-56, ISBN-10: 1634845307 and ISBN-13: 978-1-63484-530-4).
8. G. B. V. S. Lakshmi, Shumaila, Sameen Ahmed Khan, Azher M. Siddiqui,  
**Thin Films: Polyaniline and Poly(3-methylthiophene),**  
in *Encyclopedia of Plasma Technology* (First Edition), *Editor: J. Leon Shohet,*  
(Taylor & Francis Encyclopedia Program), pp. 1442-1451, (12 December 2016).  
(Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1081/E-EPLT-120053953> and  
<https://www.crcpress.com/Encyclopedia-of-Plasma-Technology/Shohet/9781466500594>).

### C. Refereed Publications

1. S. A. Khan and R. Jagannathan,  
**Quantum mechanics of charged particle beam transport through magnetic lenses**,  
*Physical Review E* **51**, 2510-2515 (March 1995).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1103/PhysRevE.51.2510>).
2. M. Conte, R. Jagannathan, S. A. Khan and M. Pusterla,  
**Beam optics of the Dirac particle with anomalous magnetic moment**,  
*Particle Accelerators* **56**, 99-126 (1996).  
<http://cds.cern.ch/record/307931/files/p99.pdf>
3. S. A. Khan and M. Pusterla,  
**Quantum-like approach to the transversal and longitudinal beam dynamics. The halo problem**,  
*European Physical Journal A* **7**(4), 583-587 (2000).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1007/s100500050430>).
4. Sameen Ahmed Khan and Modesto Pusterla,  
**Quantum approach to the halo formation in high current beams**,  
*Nuclear Instruments and Methods in Physics Research (NIMS) A* **464**, Issue 1-3, 461-464 (May 2001).  
*Refereed Proceedings of the 13th International Symposium on Heavy Ion Inertial Fusion (HIF2000)*  
(13-17 March 2000, San Diego, USA).  
(Digital Object Identifier (DOI), [http://dx.doi.org/10.1016/S0168-9002\(01\)00108-5](http://dx.doi.org/10.1016/S0168-9002(01)00108-5)).
5. Sameen Ahmed Khan and Kurt Bernardo Wolf,  
**Hamiltonian orbit structure of the set of paraxial optical systems**,  
*Journal of the Optical Society of America A* **19**(12), 2436-2444 (December 2002).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1364/JOSAA.19.002436>).
6. Sameen Ahmed Khan,  
**Wavelength-dependent modifications in Helmholtz Optics**,  
*International Journal of Theoretical Physics*, **44**(1), 95-125 (January 2005).  
(Kluwer Academic Publishers).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1007/s10773-005-1488-0>).
7. Sameen Ahmed Khan,  
**An Exact Matrix Representation of Maxwells Equations**,  
*Physica Scripta*, **71**(5), 440-442 (2005).  
(<http://www.physica.org/>).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1238/Physica.Regular.071a00440>).
8. Sameen Ahmed Khan,  
**The Foldy-Wouthuysen Transformation Technique in Optics**,  
*Optik-International Journal for Light and Electron Optics*, **117**(10), 481-488 (October 2006).  
(<http://www.elsevier-deutschland.de/ijleo/>).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1016/j.ijleo.2005.11.010>).
9. Sameen Ahmed Khan,  
**Maxwell Optics of Quasiparaxial Beams**,  
*Optik-International Journal for Light and Electron Optics*, **121**(5), 408-416 (March 2010).  
(<http://www.elsevier-deutschland.de/ijleo/>).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1016/j.ijleo.2008.07.027>).
10. Sameen Ahmed Khan,  
**Can the Photon Velocity be derived from the Klein-Gordon equation?**,  
*Optik-International Journal for Light and Electron Optics*, **122**(15), 1324-1325 (August 2011).  
(<http://www.elsevier-deutschland.de/ijleo/>).  
(Digital Object Identifier (DOI), <http://dx.doi.org/10.1016/j.ijleo.2010.08.016>).  
(Available online since Saturday the 23 October 2010).

11. Sameen Ahmed Khan,  
**Farey Sequences and Resistor Networks**,  
*Mathematical Sciences - Proceedings of the Indian Academy of Sciences*, **122**(2), 153-182 (May 2012).  
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23. Sameen Ahmed Khan, Ramaswamy Jagannathan and Rajiah Simon,  
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**Quantum Methodology Approach to Light Beam Optics**,  
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(*in preparation*).

The corrections to the traditional descriptions rigorously derived in the above articles have a significant bearing on the celebrated Scherzer Theorem in the wavelength-dependent regime in electron microscopy and the algebraically equivalent system of fiber optics. An application shall be made for a patent in the near future!

**D. E-Prints<sup>†</sup>**  
<http://arXiv.org/>

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 10 pages, *E-Print arXiv*: <http://arXiv.org/abs/physics/0205083/>.
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**Maxwell Optics: III. Applications,**  
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6. Fathiya Khamis Al Rawahi, Sameen Ahmed Khan and Abdul Huq, **Microsoft Excel in the Mathematics Classroom: A Case Study**, *in Proceedings of The Second Annual Conference for Middle East Teachers of Mathematics, Science and Computing (METSMaC 2006)*, The Petroleum Institute, Abu Dhabi, United Arab Emirates, 14-16 March 2006. *Editors*: Sean M Stewart, Janet E. Olearski and Douglas Thompson, pp. 131-134 (2006).
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(Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1119/1.3517029>).
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**Speed of Sound in Air at varying Temperatures**,  
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*Indian Journal of Science and Technology (INDJST)*, **9**(44), 1-5 (November 2016).  
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#### G. Articles in Preparation

- Ramaswamy Jagannathan and Sameen Ahmed Khan,  
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**Aberrations in Helmholtz Optics.**
- Sameen Ahmed Khan,  
**Relativistic Quantum Mechanics of Charged Particle Beam Optics.**
- Sameen Ahmed Khan,  
**Quantum Techniques in Light Beam Optics.**
- Sameen Ahmed Khan,  
**Quantum Mechanical Techniques in Light-Beam Optics.**
- Sameen Ahmed Khan,  
**Mathematical Properties of Resistor Networks.**
- Sameen Ahmed Khan,  
**Synchrotron Radiation from Prediction to Production.**
- Sameen Ahmed Khan,  
**Carbon Nanotubes, Their Functionalization and Device Applications.**
- Sameen Ahmed Khan,  
**Unified treatment of beam-optics and light polarization.**
- Sameen Ahmed Khan,  
**Set Theoretic properties of Resistor Networks.**
- Sameen Ahmed Khan,  
**Generalized Spherometer.**
- Sameen Ahmed Khan,  
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- Sameen Ahmed Khan and R. Jagannathan *et al*,  
**Maxwell Optics: IV. Polarization.**
- Sameen Ahmed Khan and Kurt Bernardo Wolf,  
**Equivalent and nonequivalent astigmatic Hamiltonians.**
- M. Conte, R. Jagannathan, S. A. Khan and M. Pusterla,  
**A quantum mechanical formalism for studying the transport of Dirac-particle beams through magnetic optical elements in accelerators.**

- S. A. Khan,  
**Anomalous moments ... Thomas-BMT ...**
- S. A. Khan and R. Jagannathan,  
**Quantum theory of aberrations in charged-particle beam optics.**
- Sameen A. Khan and Modesto Pusterla,  
**A diffraction model for the beam halo problem.**
- And Others...

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## Integer Sequences

<http://www.research.att.com/~njas/sequences/>

<http://NeilSloane.com/>

<http://oeis.org/>

<http://www.oeisf.org/>

<http://SameenAhmedKhan.webs.com/integer-sequences.html>

## Integer Sequences

The set of equivalent resistances formed by any conceivable network (series/parallel or bridge, or non-planar configurations) of  $n$  equal resistors has over twenty Integer Sequences associated with it. Ten new Integer Sequences occurring in the following article are listed below:

1. Sameen Ahmed Khan,  
**The bounds of the set of equivalent resistances of  $n$  equal resistors combined in series and in parallel,**  
37 pages, *E-Print arXiv*: <http://arxiv.org/abs/1004.3346/>.  
(Wednesday the 21 April 2010).
  2. Sameen Ahmed Khan,  
**Farey Sequences and Resistor Networks,**  
*Mathematical Sciences - Proceedings of the Indian Academy of Sciences*, **122**(2) 153-182 (May 2012).  
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*Larger Version as E-Print arXiv*: <http://arxiv.org/abs/1004.3346/>.
  3. Sameen Ahmed Khan,  
**How many equivalent resistances?,**  
*Resonance Journal of Science Education*, **17**(5), pp. 468-475 (May 2012).  
(Monthly Publication of the Indian Academy of Sciences (**IAS**), Copublished with Springer), (Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1007/s12045-012-0050-7>);  
*Larger Version as E-Print arXiv*: <http://arxiv.org/abs/1004.3346/>.
  4. Sameen Ahmed Khan,  
**Number Theory and Resistor Networks,**  
*Chapter-5 in:*  
*Resistors: Theory of Operation, Behavior and Safety Regulations,*  
Editor: Roy Abi Zeid Daou,  
(Nova Science Publishers, New York, 2013, <http://www.novapublishers.com/>).  
pp. 99-154 (May 2013).  
(Hard Cover: pp. 99-154, ISBN-10: 1622577884 and ISBN-13: 978-1-62257-788-0).  
(ebook: pp. ???-???, ISBN-10: 1626187959 and ISBN-13: 978-1-62618-795-5).
- 
1. Sameen Ahmed Khan,  
**Sequence A174283:** 1, 2, 4, 9, 23, 57, 151, 409, ...,  
**Order of the Set of distinct resistances that can be produced using  $n$  equal resistors in, series, parallel and/or bridge configurations,**  
N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
published electronically at: <http://oeis.org/A174283>  
(Monday the 15 March 2010).

2. Sameen Ahmed Khan,  
**Sequence A174284:** 1, 3, 7, 15, 35, 79, 193, 489, ...,  
**Order of the Set of distinct resistances that can be produced using at most  $n$  equal resistors ( $n$  or fewer resistors) in series, parallel and/or bridge configurations,**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A174284>  
 (Monday the 15 March 2010).
3. Sameen Ahmed Khan,  
**Sequence A174285:** 0, 0, 0, 0, 1, 3, 17, 53, ...,  
**Order of the Set of distinct resistances that can be produced using  $n$  equal resistors in, series and/or parallel, confined to the five arms (four arms and the diagonal) of a bridge configuration,**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A174285>  
 (Monday the 15 March 2010).
4. Sameen Ahmed Khan,  
**Sequence A174286:** 0, 0, 0, 0, 1, 3, 19, 67, ...,  
**Order of the Set of distinct resistances that can be produced using at most  $n$  equal resistors ( $n$  or fewer resistors) in, series and/or parallel, confined to the five arms (four arms and the diagonal) of a bridge configuration,**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A174286>  
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**Sequence A176497:** 0, 0, 0, 1, 4, 9, 25, 75, 195, 475, 1265, 3135, 7983, 19697, 50003, 126163, 317629, 802945, 2035619, 5158039, 13084381, 33240845, 84478199, ...,  
**Order of the Cross Set which is the subset of the set of distinct resistances that can be produced using  $n$  equal resistors in series and/or parallel,**  
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**Sequence A176498:** 0, 0, 0, 0, 0, 0, 0, 0, 1, 6, 9, 24, 58, 124, 312, ...,  
**Number of elements less than half in the Cross Set which is the subset of the set of distinct resistances that can be produced using  $n$  equal resistors in series and/or parallel,**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
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 (Wednesday the 21 April 2010).
7. Sameen Ahmed Khan,  
**Sequence A176499:** 2, 3, 5, 11, 23, 59, 141, 361, 941, 2457, 6331, 16619, 43359, 113159, 296385, 775897, 2030103, 5315385, 13912615, 36421835, 95355147, 249635525, 653525857, 1710966825, 4479358275, 11726974249, 30701593527, 80377757397, 210431301141, ...,  
**Haros-Farey Sequence whose argument is the Fibonacci Number; Farey( $m$ ) where  $m = \text{Fibonacci}(n + 1)$ ,**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A176499>  
 (Wednesday the 21 April 2010).
8. Sameen Ahmed Khan,  
**Sequence A176500:** 1, 3, 7, 19, 43, 115, 279, 719, 1879, 4911, 12659, 33235, 86715, 226315, 592767, 1551791, 4060203, 10630767, 27825227, 72843667, 190710291, 499271047, 1307051711, 3421933647, 8958716547, 23453948495, 61403187051, 160755514791, 420862602279, ...,  
**2Farey( $m$ ) - 3 where  $m = \text{Fibonacci}(n + 1)$ ,**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A176500>  
 (Wednesday the 21 April 2010).

9. Sameen Ahmed Khan,  
**Sequence A176501:** 1, 2, 4, 9, 19, 50, 122, 317, 837, 2213, 5758, 15236, 40028, 105079, 276627, 727409, 1910685, 5020094, ...,  
**Farey(m; I) where m = Fibonacci (n + 1) and I = [1/n, 1],**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A176501>  
 (Wednesday the 21 April 2010).
10. Sameen Ahmed Khan,  
**Sequence A176502:** 1, 3, 7, 17, 37, 99, 243, 633, 1673, 4425, 11515, 30471, 80055, 210157, 553253, 1454817, 3821369, 10040187, ...,  
**2Farey(m; I) - 1 where m = Fibonacci (n + 1) and I = [1/n, 1],**  
 N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at: <http://oeis.org/A176502>  
 (Wednesday the 21 April 2010).

## Integer Sequences for the difference for Primes in Arithmetic Progression with the minimal start Sequence $\{p_1 + jd\}_{j=0}^{j=k-1}$

11. Sameen Ahmed Khan,  
**Sequence A206037:** 2, 4, 8, 10, 14, 20, 28, 34, 38, 40, 50, 64, 68, 80, 94, 98, 104, 110, 124, 134, 154, 164, 178, 188, 190, 208, 220, 230, 238, 248, ...,  
**Values of the difference d for 3 primes in arithmetic progression with the minimal start sequence  $\{3 + j * d\}$ ,  $j = 0$  to 2.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206037>  
 (Friday the 03 February 2012).
12. Sameen Ahmed Khan,  
**Sequence A206038:** 6, 12, 18, 42, 48, 54, 84, 96, 126, 132, 252, 348, 396, 426, 438, 474, 594, 636, 642, 648, 678, 804, 858, 1176, 1218, 1272, 1302, 1314, 1362, 1428, ...,  
**Values of the difference d for 4 primes in arithmetic progression with the minimal start sequence  $\{5 + j * d\}$ ,  $j = 0$  to 3.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206038>  
 (Friday the 03 February 2012).
13. Sameen Ahmed Khan,  
**Sequence A206039:** 6, 12, 42, 48, 96, 126, 252, 426, 474, 594, 636, 804, 1218, 1314, 1428, 1566, 1728, 1896, 2106, 2574, 2694, 2898, 3162, 3366, 4332, 4368, 4716, 4914, 4926, ...,  
**Values of the difference d for 5 primes in arithmetic progression with the minimal start sequence  $\{5 + j * d\}$ ,  $j = 0$  to 4.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206039>  
 (Friday the 03 February 2012).
14. Sameen Ahmed Khan,  
**Sequence A206040:** 30, 150, 930, 2760, 3450, 4980, 9150, 14190, 19380, 20040, 21240, 28080, 33930, 57660, 59070, 63600, 69120, 76710, 80340, 81450, 97380, 100920, 105960, ...,  
**Values of the difference d for 6 primes in arithmetic progression with the minimal start sequence  $\{7 + j * d\}$ ,  $j = 0$  to 5.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206040>  
 (Friday the 03 February 2012).

15. Sameen Ahmed Khan,  
**Sequence A206041:** 150, 2760, 3450, 9150, 14190, 20040, 21240, 63600, 76710, 117420, 122340, 134250, 184470, 184620, 189690, 237060, 274830, 312000, 337530, 379410, ...,  
**Values of the difference  $d$  for 7 primes in arithmetic progression with the minimal start sequence  $\{7 + j * d\}$ ,  $j = 0$  to 6.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206041>  
 (Friday the 03 February 2012).
16. Sameen Ahmed Khan,  
**Sequence A206042:** 1210230, 2523780, 4788210, 10527720, 12943770, 19815600, 22935780, 28348950, 28688100, 32671170, 43443330, 47330640, 51767520, 54130440, ...,  
**Values of the difference  $d$  for 8 primes in arithmetic progression with the minimal start sequence  $\{11 + j * d\}$ ,  $j = 0$  to 7.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206042>  
 (Friday the 03 February 2012).
17. Sameen Ahmed Khan,  
**Sequence A206043:** 32671170, 54130440, 59806740, 145727400, 224494620, 246632190, 280723800, 301125300, 356845020, 440379870, 486229380, 601904940, 676987920, ...,  
**Values of the difference  $d$  for 9 primes in arithmetic progression with the minimal start sequence  $\{11 + j * d\}$ ,  $j = 0$  to 8.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206043>  
 (Friday the 03 February 2012).
18. Sameen Ahmed Khan,  
**Sequence A206044:** 224494620, 246632190, 301125300, 1536160080, 1760583300, 4012387260, 4911773580, 7158806130, 8155368060, 15049362300, 15908029410, ...,  
**Values of the difference  $d$  for 10 primes in arithmetic progression with the minimal start sequence  $\{11 + j * d\}$ ,  $j = 0$  to 9.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206044>  
 (Friday the 03 February 2012).
19. Sameen Ahmed Khan,  
**Sequence A206045:** 1536160080, 4911773580, 25104552900, 77375139660, 83516678490, 100070721660, 150365447400, 300035001630, 318652145070, 369822103350, 377344636200, 511688932650, ...,  
**Values of the difference  $d$  for 11 primes in arithmetic progression with the minimal start sequence  $\{11 + j * d\}$ ,  $j = 0$  to 10.,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A206045>  
 (Friday the 03 February 2012).

**Integer Sequences for the difference for Primes in  
 Geometric-Arithmetic Progression with the minimal start and  
 minimal ratio Sequence  $\{p * p^n + jd\}_{j=0}^{j=k-1}$**

- Sameen Ahmed Khan,  
**Primes in Geometric-Arithmetic Progression**,  
 19 pages, *E-Print arXiv*: <http://arxiv.org/abs/1203.2083>.  
 (Friday the 09 March 2012).

20. Sameen Ahmed Khan,  
**Sequence A209202:** 2, 8, 10, 20, 22, 28, 38, 50, 52, 62, 70, 92, 98, 100, 118, 122, 128, 140, 142, 170, 202, 218, 220, 230, 232, 248, 260, 268, 272, 302, . . . ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{3 * 3^j + jd\}_{j=0}^2$  to be a set of 3 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209202>  
 (Tuesday the 06 March 2012).
21. Sameen Ahmed Khan,  
**Sequence A209203:** 6, 12, 16, 28, 34, 36, 54, 76, 78, 84, 114, 124, 132, 138, 142, 148, 154, 166, 168, 208, 226, 258, 268, 288, 324, 348, 376, 414, 436, 442, . . . ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{5 * 5^j + jd\}_{j=0}^3$  to be a set of 4 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209203>  
 (Tuesday the 06 March 2012).
22. Sameen Ahmed Khan,  
**Sequence A209204:** 84, 114, 138, 168, 258, 324, 348, 462, 552, 588, 684, 714, 744, 798, 882, 894, 972, 1176, 1602, 1734, 2196, 2256, 2442, 2478, 2568, 2646, . . . ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{5 * 5^j + jd\}_{j=0}^4$  to be a set of 5 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209204>  
 (Tuesday the 06 March 2012).
23. Sameen Ahmed Khan,  
**Sequence A209205:** 144, 1494, 1740, 2040, 3324, 4044, 6420, 12804, 13260, 13464, 13620, 15444, 25824, 31524, 31674, 31680, 32124, 33720, 38064, 40410, . . . ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{7 * 7^j + jd\}_{j=0}^5$  to be a set of 6 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209205>  
 (Tuesday the 06 March 2012).
24. Sameen Ahmed Khan,  
**Sequence A209206:** 3324, 13260, 38064, 46260, 51810, 54510, 58914, 76050, 81510, 82434, 109800, 119340, 120714, 132390, 141480, 154254, 167904, 169734, 185040, . . . ,  
 Sameen Ahmed Khan, **Values of the difference  $d$  for the geometric-arithmetic progression  $\{7 * 7^j + jd\}_{j=0}^6$  to be a set of 7 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209206>  
 (Tuesday the 06 March 2012).
25. Sameen Ahmed Khan,  
**Sequence A209207:** 62610, 165270, 420300, 505980, 669780, 903030, 932400, 1004250, 1052610, 1093080, 1230270, 1231020, 1248120, . . . ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{11 * 11^j + jd\}_{j=0}^7$  to be a set of 8 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209207>  
 (Tuesday the 06 March 2012).

26. Sameen Ahmed Khan,  
**Sequence A209208:** 903030, 1004250, 3760290, 7296450, 7763520, 17988210, 28962390, 29956950, 33316320, 37265160, 39013800, 39768150, 43920480, 50110620, 54651480, 56388810, 74306610, 74679810, 75911850, 89115210, 92619690, 98518800, ... ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{11 * 11^j + jd\}_{j=0}^8$  to be a set of 9 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209208>  
 (Tuesday the 06 March 2012).
27. Sameen Ahmed Khan,  
**Sequence A209209:** 903030, 17988210, 28962390, 39768150, 74306610, 89115210, 116535300, 173227980, 186013380, 237952050, 359613030, 386317920, 392253990, 443687580, 499153200, 548024610, 591655080, ... ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{11 * 11^j + jd\}_{j=0}^9$  to be a set of 10 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209209>  
 (Tuesday the 06 March 2012).
28. Sameen Ahmed Khan,  
**Sequence A209210:** 443687580, 591655080, 1313813550, 2868131100, 3525848580, 3598823970, 4453413120, 6075076800, 6644124480, 7429693770, 9399746580, ... ,  
**Values of the difference  $d$  for the geometric-arithmetic progression  $\{11 * 11^j + jd\}_{j=0}^{10}$  to be a set of 11 primes,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A209210>  
 (Tuesday the 06 March 2012).
29. Sameen Ahmed Khan,  
**Sequence A227280:** 81647160420, 170655787050, 211212209880, 227961624450, ... ,  
**Values of the difference  $d$  for 12 primes in geometric-arithmetic progression with the minimal sequence  $\{13 * 13^j + j * d\}_{j=0}^{11}$ ,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A227280>  
 (Friday the 05 July 2013).

**Integer Sequences for the First primes of arithmetic progressions of  
 $k$  primes each with the common difference  $k\#$   
 Minimal Difference Sequence  $\{p_1 + j * (k\#)\}_{j=0}^{j=k-1}$**

30. Sameen Ahmed Khan,  
**Sequence A227281:** 7, 11, 37, 107, 137, 151, 277, 359, 389, 401, 541, 557, 571, 877, 1033, 1493, 1663, 2221, 2251, 2879, 3271, 6269, 6673, 6703, 7457, 7487, 9431, 10103, 10133, 10567, 11981, 12457, 12973, 14723, 17047, 19387, 24061, 25643, 25673, 26861, 26891, 27337, ... ,  
**First primes of arithmetic progressions of 5 primes each with the common difference 30,**  
 in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
 published electronically at <http://oeis.org/A227281>  
 (Friday the 05 July 2013).



31. Sameen Ahmed Khan,  
**Sequence A227282:** 47, 179, 199, 409, 619, 829, 881, 1091, 1453, 3499, 3709, 3919, 10529, 10627, 10837, 10859, 11069, 11279, 14423, 20771, 22697, 30097, 30307, 31583, 31793, 32363, 41669, 75703, 93281, 95747, 120661, 120737, 120871, 120947, 129287, 140603, 153319, ...,  
**First primes of arithmetic progressions of 7 primes each with the common difference 210,**  
in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
published electronically at <http://oeis.org/A227282>  
(Friday the 05 July 2013).
32. Sameen Ahmed Khan,  
**Sequence A227283:** 199, 409, 619, 881, 3499, 3709, 10627, 10859, 11069, 30097, 31583, 120661, 120737, 153319, 182537, 471089, 487391, 564973, 565183, 825991, 1010747, 1280623, 1288607, 1288817, 1302281, 1302491, 1395209, 1982599, 2358841, 2359051, 2439571, ...,  
**First primes of arithmetic progressions of 8 primes each with the common difference 210,**  
in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
published electronically at <http://oeis.org/A227283>  
(Friday the 05 July 2013).
33. Sameen Ahmed Khan,  
**Sequence A227284:** 199, 409, 3499, 10859, 564973, 1288607, 1302281, 2358841, 3600521, 4047803, 17160749, 20751193, 23241473, 44687567, 50655739, 53235151, 87662609, 100174043, 103468003, 110094161, 180885839, 187874017, 192205147, 221712811, 243051733, ...,  
**First primes of arithmetic progressions of 9 primes each with the common difference 210,**  
in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
published electronically at <http://oeis.org/A227284>  
(Friday the 05 July 2013).
34. Sameen Ahmed Khan,  
**Sequence A227285:** 60858179, 186874511, 291297353, 1445838451, 2943023729, 4597225889, 7024895393, 8620560607, 8656181357, 19033631401, 20711172773, 25366690189, 27187846201, 32022299977, 34351919351, ...,  
**First primes of arithmetic progressions of 11 primes each with the common difference 2310,**  
in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
published electronically at <http://oeis.org/A227285>  
(Friday the 05 July 2013).
35. Sameen Ahmed Khan,  
**Sequence A227286:** 14933623, 2085471361, ...,  
**First primes of arithmetic progressions of 13 primes each with the common difference 30030,**  
in N. J. A. Sloane (*Editor*), *The On-Line Encyclopedia of Integer Sequences*,  
published electronically at <http://oeis.org/A227286>  
(Friday the 05 July 2013).
36. Sameen Ahmed Khan,  
**Sequence A23????:**

## NON-TECHNICAL WRITINGS<sup>‡</sup> (Popular Writings)

### A. Book

- Sameen Ahmed Khan,  
**International Year of Light and Light-based Technologies**,  
LAMBERT Academic Publishing, Germany (Thursday the 30 July 2015),  
96 pages. <http://www.lap-publishing.com/>, <http://isbn.nu/9783659764820/>.  
**ISBN-13:** 978-3-659-76482-0 and **ISBN-10:** 3659764825.

### B. Book Chapter

- Sameen Ahmed Khan,  
**International Year of Light and History of Optics**,  
*Chapter-1 in:*  
*Advances in Photonics Engineering, Nanophotonics and Biophotonics*,  
Editor: Tanya Scott,  
(Nova Science Publishers, New York, 2016, <http://www.novapublishers.com/>).  
pp. 1-56 (April 2016).  
(Hard Cover: pp. 1-56, ISBN-10: 163484498X and ISBN-13: 978-1-63484-498-7).  
(ebook: pp. 1-56, ISBN-10: 1634845307 and ISBN-13: 978-1-63484-530-4).

### C. Report

- Sameen Ahmed Khan,  
**Synchrotron Radiation (in Asia)**,  
ATIP Report No. **ATIP02.034**, 28 pages (21 August 2002).  
(**ATIP:** The Asian Technology Information Program, Tokyo, Japan, 2002).

### D. Letters & Articles

1. (a) Sameen A. Khan,  
**The International Center for Theoretical Physics—A Personal Impression**,  
*Al-Nahl, Special Issue on Dr. Abdus Salam*, **8**, pp. 122–124 (Fall 1997).  
(**Al-Nahl:** A quarterly publication of Majlis Ansarullah, USA).
- (b) Sameen A. Khan,  
**Ilm aur Science ka Gahwara** (Article in Urdu, **Cradle of Knowledge and Science**),  
in the Book, *Impressions of Dr. Abdus Salam, Nobel Laureate*, by Muhammad Zakaria  
Virk, pp. 199-203 (*Abdus Salam Science Academy*, Kingston, Ontario, Canada, 2003, **ISBN:**  
18951950204).  
ICTP, the Abdus Salam International Centre for Theoretical Physics is located in Trieste, the  
Science City in Italy.
2. Sameen Ahmed Khan,  
**Letter: Young Achievers**,  
*Islamic Voice*, Vol. **12-06** No. 138, pp. 4 (June 1998, Safar 1419).

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<sup>‡</sup>This list is incomplete!

3. (a) Sameen Ahmed Khan,  
**Call for Creation of Accelerator & Beam Physics Forums,**  
*ICFA Beam Dynamics Newsletter*, **17**, 5-6 (August 1998).  
(**ICFA**: International Committee for Future Accelerators);
- (b) Sameen Ahmed Khan,  
**Call for Creation of Accelerator & Beam Physics Forums,**  
*Europhysics News*, **30**(2), 49-50 (March/April 1999).  
(Publication of **EPS**: the European Physical Society).  
(Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1007/s00770-999-0049-0>).
4. Sameen Ahmed Khan,  
**Salam's Bright Idea,**  
*Letter in Physics World*, **12**(11), 15 (November 1999).
5. Sameen Ahmed Khan,  
**Salam Inspired Plans for Mideast Synchrotron,**  
*Letter in Physics Today*, **53**(1), 78 (January 2000).  
(Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1063/1.882953>).
6. (a) Sameen Ahmed Khan,  
**Opening SESAME,**  
*Letter in CERN Courier*, **40**(3), 38 (April 2000).  
(**CERN**: European Organization for Nuclear Research).
- (b) Sameen Ahmed Khan,  
*SESAME, ouvre-toi,*  
*Lettres in Courier CERN*, **40**(3), 38 (Avril 2000).
7. Sameen Ahmed Khan,  
**Jordan to host Middle East Synchrotron,**  
*ICFA Beam Dynamics Newsletter*, **22**, 6-7 (August 2000).  
(**ICFA**: International Committee for Future Accelerators).
8. Sameen Ahmed Khan,  
**SESAME: The First Synchrotron Facility in the Middle East,**  
*AAPPS Bulletin*, **10**(2), 36-39 (December 2000).  
(**AAPPS**: Association of Asia Pacific Physical Societies).
9. Azher Majid Siddiqui and Sameen Ahmed Khan,  
**SESAME, the First International Science Centre in the Middle East:  
A Step towards the Renaissance of Science in the Islamic Countries,**  
*MASS Journal of Islamic Science*, **17** (1-2), pp 9-34 (January-December 2001/1421-22 AH).  
(**MAAS**: The Muslim Association for the Advancement of Science, Aligarh, India).
10. Sameen Ahmed Khan,  
**The Middle East Synchrotron Laboratory and India,**  
*Current Science*, **80** (2), pp. 130-132 (25 January 2001).  
(Fortnightly Publication of the Indian Academy of Sciences).
11. Sameen Ahmed Khan,  
**Middle East Synchrotron, Jordan,** (Information and Announcements),  
*Resonance Journal of Science Education*, **6**(2), back-cover-inside (February 2001).  
(Monthly Publication of the Indian Academy of Sciences (**IAS**), Copublished with Springer).  
(Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1007/BF02836948> and  
<http://dx.doi.org/10.1007/BF02836949>).
12. Sameen Ahmed Khan,  
**The Story of the Relocated Synchrotrons,**  
*Indian Science Cruiser*, **15**, No. 2, 26-30 (April 2001).
13. Sameen Ahmed Khan,  
**The Millennium Synchrotrons,**  
*Physics Teacher*, **43** (4), pp. 75-78 (October-December 2001).  
(Quarterly Publication of **IPS**: the Indian Physical Society).

14. Sameen Ahmed Khan,  
**The World of Synchrotrons**,  
*Resonance Journal of Science Education*, **6**(11), pp. 77-84 (November 2001).  
(Monthly Publication of the Indian Academy of Sciences (**IAS**), Copublished with Springer);  
(Digital Object Identifier (**DOI**), <http://dx.doi.org/10.1007/BF02868247>).  
*Larger Version as E-Print arXiv*: <http://arXiv.org/abs/physics/0112086/>.  
*Cited in*:  
**The Net Advance of Physics** (Review Articles and Tutorials in an Encyclopaedic Format), at  
<http://web.mit.edu/redingtn/www/netadv/Xsynchrotr.html>
15. Sameen Ahmed Khan,  
**A Synchrotron Radiation Facility in the Middle East**,  
*ICO Newsletter*, **51** pp. 3 (April 2002);  
*Supplement to Optics & Photonics News* (OPN), **13**(4), (April 2002).  
(**ICO**: International Commission for Optics).  
*Larger Version at the ICO Website*: <http://www.ico-optics.org/>.
16. Sameen Ahmed Khan,  
**Introduction to Synchrotron Radiation**,  
*Bulletin of the IAPT*, **19** (5), pp. 149-153 (May 2002).  
(**IAPT**: Indian Association of Physics Teachers).
17. Sameen Ahmed Khan,  
**Analogies between light optics and charged-particle optics**,  
*ICFA Beam Dynamics Newsletter*, **27**, 42-48 (June 2002).  
*E-Print arXiv*: <http://arXiv.org/abs/physics/0210028/>.  
*Cited in*:  
**The Net Advance of Physics** (Review Articles and Tutorials in an Encyclopaedic Format), at  
<http://web.mit.edu/redingtn/www/netadv/Xoptics.html>
18. Sameen Ahmed Khan,  
**Prospects for an Asian Accelerator Laboratory**,  
*AAPPS Bulletin*, **12**(2), pp. 21-27 (June 2002).  
(**AAPPS**: Association of Asia Pacific Physical Societies).
19. Sameen Ahmed Khan,  
**Electron Beams for Radiation**,  
*Kiran*, **13**(3), 40-42 (July 2002).  
(**Kiran**: the Bulletin of the Indian Laser Association).
20. Sameen Ahmed Khan,  
**A German Synchrotron for the Middle East**,  
*IRPS Bulletin*, **16** (2), 5-8 (August 2002).  
(**IRPS**: International Radiation Physics Society).
21. Sameen Ahmed Khan,  
**When will there be an Asian Accelerator Laboratory?**,  
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(**ICFA**: International Committee for Future Accelerators).
22. Azher Majid Siddiqui and Sameen Ahmed Khan,  
**Ion Beam Channeling and Accelerator Programmes in India**,  
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(**MRSI**: Materials Research Society of India).
23. Sameen A. Khan and Susan M. Reiss,  
**Donated Synchrotron will Further Middle East Cooperation;  
Sharing Synchrotrons**,  
*Optics & Photonics News* (OPN), **13**(11), pp. 14-15 (November 2002).
24. Sameen Ahmed Khan,  
**The Middle East Synchrotron Facility can bring Regional Cooperation**,  
*Digest of Middle East Studies* (DOMES), **11**(2), 57-71 (Winter/December 2002).  
Digital Object Identifier (**DOI**): <http://dx.doi.org/10.1111/j.1949-3606.2002.tb00457.x>.

25. Sameen Ahmed KHAN and Azher Majid SIDDIQUI, **Story of the Middle East Synchrotron**, *Pakistan Link*, pp. ??? (Friday the 24 January 2003). (Published from Irvine, California, USA).
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(b) Sameen Ahmed Khan,  
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(b) Sameen Ahmed Khan,  
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- (c) Sameen Ahmed Khan,  
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**Views of Naat in the Light of Shari'ah-II,**  
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- (b) Sameen Ahmed Khan,  
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*Tarjumani/Translator:* Dr. Azher Majid Siddiqui, <http://azhermajidsiddiqui.webs.com/>.
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Published by Bihar Anjuman, <http://bakhabar.biharanjuman.org/>.
- (c) Sameen Ahmed Khan,  
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**The Islamic Golden Age of Science, The Ibn Al-Haytham Example**,  
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(Publication of **ISNA**: the Islamic Society of North America).
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**Iran Launches Mustafa Prize,**  
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**Report: Second National Urdu Science Congress,**  
(*Report of the Second National Urdu Science Congress, 20-21 February 2016, Aligarh, India*),  
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- (b) Sameen Ahmed Khan,  
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(*Report of the Second National Urdu Science Congress, 20-21 February 2016, Aligarh, India*),  
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**Iran Launches the Mustafa Prize for Sciences,**  
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The Prizes are awarded in alternate years by the Government of Iran, <http://mustafaprize.org/>.
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- (b) Hajira Khan and Sameen Ahmed Khan,  
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The Prize is awarded by the Division of Plasma Physics under Association of Asia Pacific Physical Societies.
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**Ahmed Hassan Zewail (1946-2016)**,  
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(b) Sameen Ahmed Khan,  
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(c) Sameen Ahmed Khan,  
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**Ahmed Hassan Zewail (19462016)**,  
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**Niyaz Ahmed Conferred the Shanti Swarup Bhatnagar Prize in Medical Sciences**,  
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(c) Sameen Ahmed Khan,  
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(d) Sameen Ahmed Khan,  
**Niyaz Ahmed Conferred Shanti Swarup Bhatnagar Prize in Medical Sciences**,  
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**Our Multiplication Tables**,  
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**Multiplication Table**,  
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**Beginning to count the Number of Equivalent Resistances**,  
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(b) Sameen Ahmed Khan,  
**2017 King Faisal International Prizes**,  
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The Prizes are awarded every year by the King Faisal Foundation (KFF), Saudi Arabia.
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**2017 King Faisal Prize awarded to Daniel Loss and Laurens Molenkamp**,  
*e-EPS Newsletter* (23 February 2017).  
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(Fortnightly Publication of the Indian Academy of Sciences).  
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For the *Proceedings of Higher Education in Developing Countries: With a Focus on Muslim Contexts*, The Aga Khan University Institute for the Study of Muslim Civilisations, (AKU-ISMC), (24-25 February 2005, London, UK).  
10 pages (*communicated*).
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**E-Learning Challenges and Prospects in the Middle East**,  
*The Online Virtual Conference of the World Forum on Information Society (WFIS)*, (31 March - 13 November 2005), *Pre-Cursor* to the **IRFD World Forum 2005**, 14-16 November  
**Conference on Digital Divide, Global Development and the Information Society**, Organized by **United Nations World Summit on the Information Society**, Tunis, Tunisia.  
(**IRFD**: International Research Foundation for Development).  
06 pages (*submitted*).

216. Sameen Ahmed Khan,  
**Solar Cells Technology bags the 2015 King Faisal International Prize,**  
(*in preparation*).
217. Sameen Ahmed Khan,  
**Medieval Arab Achievements in Optics.**  
(*in preparation*).
218. Sameen Ahmed Khan,  
**Need to Create International Science Centres in Arab Countries.**  
(*in preparation*).
219. Sameen Ahmed Khan,  
**Need to Create International Synchrotron Radiation Facilitie.**  
(*in preparation*).
220. Sameen Ahmed Khan,  
**Medieval Arab Contributions to Optical Sciences.**  
(*in preparation*).
221. Sameen Ahmed Khan,  
**Need to Create Regional International Science Centres in Arab Countries.**  
(*in preparation*).
222. Sameen Ahmed Khan,  
**Medieval Arab Contributions to Optics;**  
**Medieval Arab Contributions to Physics;**  
**Medieval Arab Contributions to Mathematics.**  
(*in preparation*).
223. Sameen Ahmed Khan,  
**ICTP Golden Jubilee Celebrations,**  
(*in preparation*).  
ICTP the The Abdus Salam International Centre for Theoretical Physics is located in Trieste the Science City in Italy.
224. Sameen Ahmed Khan,  
**Sonometer,**  
(*in preparation*).
225. Sameen Ahmed Khan,  
**International Day of Light (ILD, <https://www.lightday.org/>),**  
(*in preparation*).
226. Azher Majid Siddiqui and Sameen Ahmed Khan,  
**Introduction to Ion Beam Channeling.**  
(*in preparation*).
227. Sameen Ahmed Khan,  
**Set Theoretic properties of Resistor Networks.**

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In March 2005, I was appointed as the *Regular Correspondent* for the ICFA Beam Dynamics Panel Newsletters, for the regions of Middle East & Africa. ICFA, the International Committee for Future Accelerators, provides a forum to discuss and implement plans for further promoting collaborative accelerator-based science. Its primary purpose is to strengthen collaboration in accelerator-based science, to encourage future projects, and to make recommendations to governments. Further details at:

<http://icfa-usa.jlab.org/archive/newsletter.shtml>

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**PARTICIPATION IN CONFERENCES/SEMINARS/COLLOQUIA  
VISITS TO INSTITUTIONS**

1. 07-15 November 1993  
**The CERN Accelerator School: Physics & Engineering for Particle Accelerators,**  
*Held at:* Raja Ramanna Centre for Advanced Technology (RRCAT), Indore, India.
2. 25-27 November 1993  
**3rd National Seminar on Physics and Technology of Particle Accelerators and their Applications PATPAA-93.** *Held at:* IUC-DAEF, Kolkata (Calcutta) Centre, India,  
*Poster:* **Theory of relativistic electron beam transport based on the Dirac equation.**
3. 17-29 March 1994  
**JSPS-KEK International Spring School: High Energy Ion Beams—Novel Beam Techniques and their Applications,** *Held in Japan at:*  
National Laboratory for High Energy Physics (KEK)  
Institute of Nuclear Study (INS)  
Institute of Physical and Chemical Research (RICKEN)  
*Talk:* **Quantum mechanics of charged particle beam optics: An operator approach.**
4. 23 January - 10 February 1995  
**SERC School<sup>§</sup> on Coherence and Correlations in Modern Optics and Quantum Physics,**  
*Held at:* The Institute of Mathematical Sciences, Chennai (Madras), India  
*Talk:* **Charged Particle Optics — A Wigner function approach.**
5. 11 November 1995  
**High-Energy Physics in the 21st Century,**  
**61st Annual Meeting of Indian Academy of Science,**  
*Held at:* Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India.
6. 09 March 1996  
**Workshop on Internet for Educational and Research Organizations,**  
*Held at:* The Institute of Mathematical Sciences, Chennai (Madras), India
7. 22-23 August 1996  
**Young Physicists Colloquium,**  
*Organized by:* The Indian Physical Society (IPS), Kolkata (Calcutta), India,  
*Talk:* **Beam optics of the Dirac particle.**
8. 10-15 January 1997  
**International Conference on Dynamical Systems,**  
*Held at:* The Indian Institute of Science, Bangalore, India,  
*Poster:* **Transport of Dirac-particle beams through magnetic quadrupoles.**
9. 13-25 January 1997  
**School on Physics of Beams,**  
*Held at:* Raja Ramanna Centre for Advanced Technology (RRCAT), Indore, India,  
*Talk:* **Beam optics of the Dirac particle.**
10. 03-21 March 1997  
**Winter College on Quantum Optics: Novel Radiation Sources,**  
*Held at:* The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy,  
*Talk:* **Quantum mechanical approach to beam physics.**
11. 25-27 March 1997  
Dipartimento di Fisica Galileo Galilei  
Università di Padova  
Istituto Nazionale di Fisica Nucleare (INFN),  
Sezione di Padova, Padua/Padova, Italy.
12. 19-22 November 1997  
**Salam Memorial Meeting**  
*Held at:* The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy.

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<sup>§</sup> Actively involved in capacity as the **Member of the Local Organizing Committee** and **Publicity Secretary**. The School Circular appeared in numerous places including, *CERN Courier*, 34(9), 23-24 (November 1994); and *AAPPS Bulletin*.

13. 09-13 December 1997  
**Istituto Nazionale di Fisica Nucleare (INFN)**,  
Sezione di Naples, Naples, Italy.  
*Talk-I: Transport of Dirac particle beams through magnetic quadrupoles*  
*Talk-II: Wigner function approach to quantum theory of charged-particle beam optics.*
14. 04-09 January 1998  
**15th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics**,  
Monterey, California, USA,  
*Talk: Quantum theory of magnetic quadrupole lenses for spin- $\frac{1}{2}$  particles.*
15. 12-14 January 1998  
**Center for Beam Physics**,  
Ernest Orlando Lawrence Berkeley National Laboratory (LBNL),  
University of California, Berkeley, USA.  
**Quantum theory of magnetic quadrupole lenses for spin- $\frac{1}{2}$  particles.**
16. 19-30 January 1998  
**US Particle Accelerator School (USPAS)**,  
University of Texas at Austin, Austin, USA.
17. 13-15 May 1998  
**Workshop on Non-Linear Problems in Charged-Particle Beam Transport in Linear and Recirculated Accelerators, Analysis of Transverse and Longitudinal Instabilities**,  
Italian National Agency for New Technology, Energy and Environment (ENEA), Frascati, Italy,  
*Talk: Quantum methodology in beam physics.*
18. 28 June - 05 July 1998  
**Deutsches Elektronen-Synchrotron (DESY)**,  
Hamburg, Germany.  
*Talk: Quantum theory of accelerator optics.*
19. 09-10 November 1998  
**Fermi National Accelerator Laboratory (Fermilab)**,  
Batavia, Illinois, USA.  
*Talk: Quantum theory of charged-particle optics.*
20. 12-13 November 1998  
**Brookhaven National Laboratory (BNL)**,  
Upton, New York, USA.  
*Talk: Quantum theory of charged-particle optics.*
21. 20-26 March 1999  
**Centennial Meeting of the American Physical Society**,  
*Held at:* Atlanta, Georgia, USA,  
*Talk: Quantum aspects of charged-particle beam optics.*
22. 29 March - 02 April 1999  
**1999 Particle Accelerator Conference (PAC99)**,  
*Held at:* New York City, USA,  
*Poster-I: Quantum aspects of accelerator optics,*  
*Poster-II: Quantum mechanical aspects of the halo puzzle.*
23. 24-29 May 1999  
**6th International Conference on Squeezed States and Uncertainty Relations (ICSSUR'99)**,  
*Held at:* Dipartimento di Scienze Fisiche, Università di Napoli "Federico II", Napoli, Italy,  
*Poster: Quantum-like approaches to the beam halo problem.*
24. 15-17 December 1999.  
**National Laser Symposium (NLS-1999)**,  
*Held at:* School of Physics, University of Hyderabad,  
Hyderabad, India.
25. 29 January - 29 February 2000  
**The Institute of Mathematical Sciences (IMSc/Matscience)**,  
Chennai (Madras), India.



26. 15-20 October 2000  
**18th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics**,  
Capri, Italy,  
*Talk: Quantum formalism of beam optics.*
27. 21-26 October 2000  
**Dipartimento di Fisica**,  
Università di Salerno,  
Salerno, Italy
28. 23 October 2000  
**Mini Workshop on Quantum Methodologies in Beam Physics**,  
*Held at:* Dipartimento di Fisica,  
Università di Salerno,  
Salerno, Italy,  
*Talk: Quantum Aspects of Charged-Particle Beam Optics.*
29. 18-22 December 2000  
**XIV DAE Symposium on High Energy Physics**,  
*Held at:* School of Physics,  
University of Hyderabad,  
Hyderabad, India.
30. 10-14 December 2001  
**Mathematical Results in Quantum Mechanics**,  
*Held at:* Taxco, MÉXICO.
31. 02-06 September 2002  
**IV International Workshop on Classical and Quantum Integrable Systems**,  
*Held at:* Centro de Ciencias Físicas, Universidad Nacional Autónoma de México (UNAM), Cuernavaca, Morelos, MÉXICO.
32. 23 May - 22 June 2003  
**Middle East College of Information Technology (MECIT)**,  
Technowledge Corridor, Knowledge Oasis Muscat (KOM)  
Muscat, Sultanate of Oman.
33. 19 May 2004  
**International Conference in E-Business  
E-Business in GCC Challenges and Prospects (EGCC'04)**  
Majan College (University College)  
Muscat, Sultanate of Oman.  
*Presentation: E-Learning Challenges in the Middle East.*
34. 23-30 August 2004  
**The Institute of Mathematical Sciences (IMSc/Matscience)**,  
Chennai (Madras), India.
35. 24-25 February 2005  
**Higher Education in Developing Countries: With a Focus on Muslim Contexts**,  
The Aga Khan University Institute for the Study of Muslim Civilisations (AKU-ISMC), London,  
UK.  
*Talk: Need to Create Regional Science Centres in the Developing Countries.*
36. 31 March - 13 November 2005  
*The Online Virtual Conference of the World Forum on Information Society (WFIS)*,  
*Pre-Cursor to the IRFD World Forum 2005*  
14-16 November  
**Conference on Digital Divide, Global Development and the Information Society**  
Organized by United Nations World Summit on the Information Society,  
Tunis, Tunisia.  
(IRFD: International Research Foundation for Development).  
*Presentation: E-Learning Challenges and Prospects in the Middle East.*
37. 08-09 May 2005  
**ICT 2005: The business value of IT**  
Muscat, Sultanate of Oman.

38. 31 October - 02 November 2005  
**World Conference on Physics and Sustainable Development (WCPSD)**,  
Durban, South Africa.  
*Presentation: Role of Physics Institutions in International Collaborations.*
39. 14-15 November 2005  
**The Second Engineering Students Gathering**  
College of Engineering  
Sultan Qaboos University  
Muscat, Sultanate of Oman.  
(Participated as a *Referee* for the Project Presentations).
40. 23-24 January 2006  
**PEIE's Smart Manufacturing Conference**,  
Muscat, Sultanate of Oman.  
(**PEIE**: Public Establishment for Industrial Estates, <http://www.peie.om/>).
41. 23-25 November 2006  
Dipartimento di Fisica Galileo Galilei  
Università di Padova  
**Istituto Nazionale di Fisica Nucleare (INFN)**,  
Sezione di Padova, Padua/Padova, Italy.  
*Collaboration: The Halo Problem in Accelerator Beams.*
42. 27 November - 01 December 2006  
**Workshop on Economic Development for Physicists from Developing Countries (EDPDC)**,  
*Held at: The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy,*
43. 15-18 August 2007  
**The Institute of Mathematical Sciences (IMSc/Matscience)**,  
Chennai (Madras), India.
44. 02-04 January 2013  
The Institute of Mathematical Sciences Golden Jubilee Conference,  
**The Institute of Mathematical Sciences (IMSc/Matscience)**,  
Chennai (Madras), India.
45. 17-18 April 2013  
**International Conference on Business Management 2013  
Omani Economy & Globalization:  
Emerging Modernization & Benchmarking (ICBM-2013)**  
College of Commerce and Business Administration (CCBA)  
**Dhofar University**  
Salalah, Dhofar  
Sultanate of Oman.
46. 25-30 August 2013  
**13th Asian Quantum Information Science Conference (AQIS13),  
The Institute of Mathematical Sciences (IMSc/Matscience)**,  
Chennai (Madras), India.
47. 28 September 2014  
**The Research Council Awareness Programme**  
TRC: The Research Council (of Oman)  
**Dhofar University**  
Salalah, Dhofar  
Sultanate of Oman.
48. 13-15 December 2014  
**Second Arab-American Frontiers of Sciences, Engineering, and Medicine Symposium**  
Muscat  
Sultanate of Oman.  
*Poster Presentation: Gearing up for the International Year of Light.*

49. 14-15 September 2015  
**The Islamic Golden Age of Science for today's Knowledge-based Society: The Ibn Al-Haytham Example**  
 Room II  
 UNESCO Headquarters  
 Paris  
**FRANCE.**  
*Oral Presentation: Medieval Arab Achievements in Optics.*
50. 11-14 July 2016  
**AP Summer Institute**  
**Calculus AB: For New Teachers**  
 Continuing and Professional Studies  
 University of Houston  
 Houston, Texas,  
 USA.  
 (**AP**: Advanced Placement, Equivalent of 30 Contact Hours and 3 Continuing Education Units).
51. 22-25 February 2017  
 Frontiers in Theoretical and Applied Physics Conference 2017 (**FTAPS 2017**)  
 American University of Sharjah  
 Sharjah  
 United Arab Emirates  
 UAE.  
*Oral Presentation: Relativistic Quantum Mechanics of Charged Particle Beam Optics.*  
*Poster-1: Quantum Techniques in Light Beam Optics.*  
*Poster-2: Need to Create International Synchrotron Radiation Facilities.*  
*Poster-3: Mathematical Properties of Resistor Networks.*

### Conferences & Visits of Interest

1. July-August 2017  
**The Institute of Mathematical Sciences (IMSc/Matscience),**  
 Chennai (Madras), India.
2. July-August 2017  
**Chennai Mathematical Institute (CMI),**  
 Chennai (Madras), India.
3. 21-25 August 2017  
**24th Congress of the International Commission for Optics (ICO-24)**  
 Tokyo,  
 Japan  
<http://ico24.org/>.
4. 20-25 May 2018  
**International Particle Accelerator Conference (IPAC-2018)**  
 Vancouver,  
 Canada.
5. 25-29 May 2019  
**International Particle Accelerator Conference (IPAC-2019)**  
 Melbourne Convention & Exhibition Centre  
 Melbourne  
 Australia.

### ANNUAL MEMBERSHIPS

- **American Physical Society**
  - The Division of Atomic, Molecular, and Optical Physics (**DAMOP**)
  - The Division of Physics of Beams (**DPB**)
  - Forum on Education (FEd)
  - Forum on International Physics (**FIP**)

- **International Association of Mathematical Physics (IAMP)**
- **International Radiation Physics Society (IRPS)**
- **Optical Society of America (OSA)**

### LIFE MEMBERSHIPS OF ACADEMIC ORGANIZATIONS

- **Indian Physical Society**  
*IPS*  
Life Membership No. IPS/LM/95  
Department of Material Science  
Indian Association for Cultivation of Science  
Jadavpur  
**KOLKATA (CALCUTTA) 700032**
- **Particle Accelerator Society of India**  
*PASI*  
Life Membership No.  
Accelerator Office  
Raja Ramanna Centre for Advanced Technology (**RRCAT**)  
Post: RRCAT Rajendranagar  
**INDORE 452013**
- **Optical Society of India**  
*OSI*  
Life Fellow No. L 225  
Department of Applied Physics  
University of Calcutta  
92, Acharya Prafulla Chandra Road  
**KOLKATA (CALCUTTA) 700009**
- **Materials Research Society of India**  
*MRSI*  
Life Membership No. L 1069  
C/O Composites Group  
Defence Metallurgical Research Laboratory  
P.O Kanchanbagh  
**HYDERABAD 500258**
- **Indian Association of Physics Teachers**  
*IAPT*  
Life Membership No. 5304-L2529  
L-117/302, Naveen Nagar  
**KANPUR 208025**
- **Astronomical Society of India**  
*ASI*  
Life Membership No. L/959  
Department of Astronomy  
Osmania University  
**HYDERABAD 500007**
- **Indian Physics Association**  
*IPA*  
Life Membership No. MAS/LM/10896  
Tata Institute of Fundamental Research  
Homi Bhabha Road  
Colaba  
**MUMBAI (BOMBAY) 400005**
- **Power Beam Society of India**  
*PSI*  
Life Membership No.  
Electron Beam Centre  
Kharghar  
Sector 7, CBD  
**NAVI MUMBAI (BOMBAY) 400614**
- **Indian Laser Association**  
*ILA*  
Life Membership No. LM/348  
Laser Research & Development Block-B  
Raja Ramanna Centre for Advanced Technology (**RRCAT**)  
Post: RRCAT Rajendranagar  
**INDORE 452013**
- **Indian Society of Atomic and Molecular Physics** *ISAMP*  
Life Membership No. 1181  
Physical Research Laboratory (**PRL**)  
Navrangpura  
**AHMEDABAD 380009**
- **Indian Society for Technical Education**  
*ISTE*  
Life Membership No. LM 24901  
Indian Institute of Technology Campus  
Hauz Khas  
**NEW DELHI 110016**
- **Indian Association for General Relativity and Gravitation** *IAGRG*  
Life Membership No.  
Inter-University Centre for Astronomy and Astrophysics  
Post Bag 4, Ganeshkhind  
**PUNE 411007**

- **Electrochemical Society of India**  
*ECSEI*  
Life Fellow Membership No. F-214  
Indian Institute of Science Campus  
**BANGALORE 560012**
- **Magnetics Society of India**  
*MSI*  
Life Membership No. LM-211  
C/O Composites Group  
Defence Metallurgical Research Laboratory  
P.O Kanchanbagh  
**HYDERABAD 500258**
- **Semiconductor Society (India)**  
*SSI*  
Life Membership No.  
Solid State Physics Laboratory  
Lucknow Road  
**DELHI 110054**
- **Indian Society for Mass Spectrometry**  
*ISMAS*  
Life Membership No. LM-629  
Fuel Chemistry Division  
Bhabha Atomic Research Centre (**BARC**)  
**MUMBAI (BOMBAY) 400085**
- **Indian Nuclear Society**  
*INS*  
Life Membership No. LM-6658  
Project Square, Anushaktinagar  
**MUMBAI (BOMBAY) 400094**
- **Forum of Scientists, Engineers & Technologists** *FOSET*  
Life Membership No. LM/2001-1187  
15 N, Lindsay Street  
New CMC Building (5th Floor)  
**KOLKATA (CALCUTTA) 700087**
- **Solar Energy Society of India**  
*SESI*  
Life Membership No. 0949/LM/2000  
Tata Energy Research Institute  
Darbari Seth Block, Habitat Place, Lodhi Road  
**NEW DELHI 110003**
- **Plasma Science Society of India**  
*PSSI*  
Life Membership No. L-415  
Institute for Plasma Research  
Bhat  
**GANDHINAGAR 382424**
- **Powder Metallurgy Association of India**  
*PMAI*  
Life Membership No. LM-486  
Hoganas India Ltd.  
4, North Road, Koregaon  
Park  
**PUNE 411007**
- **Indian Society for Surface Science and Technology** *ISSST*  
Life Membership No. K-31  
Department of Chemistry  
Jadavpur University  
**KOLKATA (CALCUTTA) 700032**
- **Indian Vacuum Society**  
*IVS*  
Life Membership No. LM 709  
Technical Physics & Prototype Engineering  
Division  
Bhabha Atomic Research Centre (**BARC**)  
**MUMBAI (BOMBAY) 400085**
- **Association of Medical Physicists of India**  
*AMPI*  
Life Membership No. LM-1685  
Radiological Physics & Advisory Division  
(RPAD)  
Bhabha Atomic Research Centre (**BARC**)  
CT&CRS Building, Anushaktinagar  
**MUMBAI (BOMBAY) 400094**

- **Indian Academy of Mathematics**  
*IAM*  
Life Membership No. LM-128  
15, Kaushaliyapuri  
Chitawad Road  
**INDORE 452001**
- **Ramanujan Mathematical Society**  
*RMS*  
Life Membership No.  
Ramanujan Institute for Advanced Studies  
in Mathematics  
University of Madras  
**CHENNAI (MADRAS) 600005**
- **Indian Society for History of Mathematics**  
*ISHM*  
Life Membership No. L-132  
Department of Mathematics  
Ramjas College  
University of Delhi  
**NEW DELHI 110007**
- **Indian Statistical Institute**  
*ISI*  
Life Membership No. L/7827  
203, Barrackpore Trunk Road  
**KOLKATA (CALCUTTA) 700035**
- **Operational Research Society of India**  
*ORSI*  
Senior Life Membership  
No. 0476/S/00/MSL  
39, Mahanirvan Road  
**KOLKATA (CALCUTTA) 700029**
- **Cryptology Research Society of India**  
*CRSI*  
Life Membership No. L/154  
Applied Statistics Unit  
Indian Statistical Institute  
203, Barrackpore Trunk Road  
**KOLKATA (CALCUTTA) 700108**
- **Association of Mathematics Teachers of India**  
*AMTI*  
Life Membership No. L01012  
B-19, Vijay Avenue, Old No. 37, New No. 85  
Venkatatarangam Street, Triplicane  
**CHENNAI (MADRAS) 600005**
- **Society for Special Functions and their Applications**  
*SSFA*  
Life Membership No. 321  
Department of Mathematics  
Aligarh Muslim University  
**ALIGARH 202002**
- **Indian Society for Mathematical Modeling and Computer Simulation**  
*ISMMCS*  
Life Membership No.  
Department of Mathematics  
Indian Institute of Technology (IIT) Kanpur  
**KANPUR 208016**
- **Indian Statistical Association**  
*ISA*  
Life Membership No. 197  
Department of Statistics, University of Poona  
**PUNE 411007**
- **Computer Society of India**  
*CSI*  
Life Membership No. 00059965  
122, T. V. Industrial Estate  
S. K. Ahire Marg  
**MUMBAI (BOMBAY) 400025**
- **Indian Association for Medical Informatics**  
*IAMI*  
Life Membership No. PL04353  
Department of Surgery, GMCH  
1155, Sector-32-B  
**CHANDIGARH**

- **Society for Information Science**  
*SIS*  
Life Membership No.  
NISTADS (CSIR)  
Dr. K S Krishana Marg  
**NEW DELHI 110012**
- **Indian Science Congress Association**  
*ISCA*  
Life Membership, No. L-8707 (8544)  
14, Dr. Biresh Guha Street  
**KOLKATA (CALCUTTA) 700017**
- **The Society for Progress of Science**  
*SPS*  
Life Membership No.  
Pragati Prakashan  
Post Box No. 62, New Market Begum Bridge  
**MEERUT 250001**
- **Regional Science Association**  
*RSA*  
Life Membership No. 380  
CK-134, Sector-II, Salt Lake City  
**KOLKATA (CALCUTTA) 700091**
- **Indian Science Writers' Association**  
*ISWA*  
Life Membership No. LM-K 007  
25/3, Sector-I  
Pushp Vihar  
**NEW DELHI 110017**
- **Indian Library Association**  
*ILA*  
Life Membership No. SL/5093  
A/40-41, Flat No. 201  
Ansal Building, Dr. Mukherjee Nagar  
**NEW DELHI 110009**
- **Indian Innovators Association**  
*IIA*  
A-50, Ashoka Enclave-II  
Sector 37  
**FARIDABAD 121003**
- **Institute of Science, Education & Culture**  
*ISEC*  
Life Membership No.  
ISEC House, 42-B, Syed Amir Ali Avenue  
**KOLKATA (CALCUTTA) 700017**
- **Indian Adult Education Association**  
*IAEA*  
Life Membership No.  
Shafiq Memorial  
17 B, Indraprastha Estate  
**NEW DELHI 110002**
- **All India Association for Educational Research** *AIÆR*  
Life Membership No. 724 (AP 13)  
N1/55, IRC Village  
**BHUBANESWAR 751015**
- **United Writers' Association**  
*UWA*  
Life Fellow Membership No. 850/03  
75 Kamakoti Nagar, Second Cross Street  
Valasaravakkam  
**CHENNAI (MADRAS) 600087**
- **Indian Association of Special Libraries & Information Centres** *IASLIC*  
Life Membership No.  
P 291, CIT Scheme 6M  
Kankurgachi  
**KOLKATA (CALCUTTA) 700054**



- **All India Muslim Educational Society**  
*AIMES*  
Life Membership No.  
A-1-D, Anugraha  
19, Nungambakkam High Road  
**CHENNAI (MADRAS) 600034**
- **Indian Association of Muslim Social Scientists** *IAMSS*  
Life Membership No.  
162, Jogabai Extension  
Jamia Nagar  
**NEW DELHI 110025**
- **Ibn Sina Academy of Medieval Medicine & Sciences** *IAMMS*  
Life Membership No.  
Tijara House  
Dodhpur  
**ALIGARH 202002**
- **The Muslim Association for the Advancement of Science** *MAAS*  
Life Associate No. 9701B130  
Darul Fikr, The Main Road  
Iqra Colony  
New Sir Syed Nagar  
**ALIGARH 202002**
- **Indian Association for Islamic Economics** *IAFIE*  
Life Membership No.  
4-1212  
Sir Syed Nagar  
**ALIGARH 202002**
-