

# Curriculum Vitæ

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## DATOS PERSONALES

**Fecha de nacimiento:** 17 de Agosto 1966  
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**Posición post-doctoral**      Investigador responsable: Dr. Kurt Bernardo Wolf  
CCF-UNAM, Cuernavaca.      Tel: (7) 317-3388

**Empleos previos**                      INFN Post-Doctoral Fellow, con el Prof. Modesto Pusterla  
Dipartimento di Fisica Galileo Galilei, Università di Padova  
Istituto Nazionale di Fisica Nucleare (**INFN**)  
Sezione di Padova, ITALY  
(del 27 de Octubre 1997 al 26 de Octubre 1999)

Junior Research Fellow (JRF)  
The Institute of Mathematical Sciences, Chennai (Madras) INDIA

**Formación Académica:**

<b>B.Sc. Honours (Física)</b>	1988, Osmania University, Hyderabad
<b>M.Sc. (Física)</b>	1990, Indian Institute of Technology (IIT), Kanpur
<b>Ph.D</b>	1997, The Institute of Mathematical Sciences, Chennai (Madras)
<b>Título de la tesis:</b>	<i>Quantum theory of charged-particle beam optics</i>
<b>Tópico de la tesis:</b>	Desarrollo de técnicas matemáticas para el transporte de haces de partículas cargadas mediante campos electromagnéticos.
<b>Supervisor de tesis:</b>	Prof. R. Jagannathan

**Campo de investigación:** Física de haces de partículas con spin y fotones  
 Óptica de aceleradores y microscopía electrónica  
 Desarrollos en series de aberraciones  
 Geometría simpléctica del espacio fase.

**DISTINCIONES** Ganador de la Olimpiada en Matemáticas (nivel estatal):  
 Junior Level (1983)  
 Senior Level (1985) y Degree Level (1986 a 1988)

Conferencia invitada en el Young Physicists Colloquium  
 Kolkata (Calcutta), Agosto 1996

## PUBLICACIONES

### A. Publicaciones arbitradas:

- S. A. Khan y R. Jagannathan,  
**On the quantum mechanics of charged particle beam transport through magnetic lenses,**  
*Phys. Rev.* **E 51**, 2510–2515 (1995).
- R. Jagannathan y S. A. Khan,  
**Quantum theory of the optics of charged particles,**  
*Advances in Imaging and Electron Physics, Editores: P. W. Hawkes, B. Kazan y T. Mulvey,*  
 (Academic Press, San Diego, 1996) **Vol. 97**, pp. 257–358 (1996).
- M. Conte, R. Jagannathan, S. A. Khan y M. Pusterla,  
**Beam optics of the Dirac particle with anomalous magnetic moment,**  
 Preprint: IMSc/96/03/07, INFN/AE-96/08  
*Particle Accelerators* **56**, 99–126 (1996).

- Sameen Ahmed Khan y M. Pusterla,  
**Quantum-like approach to the transversal and longitudinal beam dynamics. The halo problem,**  
*Euro. Phys. Journal A* **7** No. 4, 583–587 (2000).
- Sameen Ahmed Khan y M. Pusterla,  
**On the form of Lorentz-Stern-Gerlach force,**  
(*sometido*).
- R. Jagannathan, S. A. Khan y R. Simon,  
**Foldy-Wouthuysen transformation and a quasiparaxial scheme for the scalar wave theory of light beams,**  
(*sometido*).

### B. Memorias in extenso y preimpresos

- S. A. Khan y R. Jagannathan,  
**Theory of relativistic electron beam transport based on the Dirac equation,**  
*en: Proceedings of the 3rd National Seminar on Physics and Technology of Particle Accelerators and their Applications PATPAA-93* (25–27 November 1993, Kolkata (Calcutta)),  
*Editor: S. N. Chintalapudi (IUC-DAEF, Kolkata (Calcutta)), pp. 102–107.*
- S. A. Khan y R. Jagannathan,  
**Quantum mechanics of charged particle beam optics: An operator approach,**  
Preprint: IMSc-94/11 Presentado en el **JSPS–KEK** International Spring School on High Energy Ion Beams — Novel Beam Techniques and their Applications, Japón, 17–29 Marzo 1994.
- R. Jagannathan y S. A. Khan,  
**Wigner functions in charged particle optics,**  
*en: Selected Topics in Mathematical Physics — Professor R. Vasudevan Memorial Volume,*  
*Editores: R. Sridhar, K. Srinivasa Rao, y V. Lakshminarayanan*  
(Allied Publishers, Delhi, 1995), pp. 308–321.
- S. A. Khan,  
**Transport of Dirac-particle beams through magnetic quadrupoles,**  
Preprint: IMSc/96/33 (The Institute of Mathematical Sciences, Chennai (Madras), Dic. 1996).
- R. Jagannathan y S. A. Khan,  
**Quantum mechanics of accelerator optics,**  
*ICFA Beam Dynamics Newsletter*, **13**, pp. 21–27 (April 1997).  
(**ICFA**: International Committee for Future Accelerators).

- S. A. Khan,  
**Quantum theory of magnetic quadrupole lenses for spin- $\frac{1}{2}$  particles,**  
*en: Proceedings of the 15th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics, (04–09 Enero 1998, Monterey, California USA),*  
*Editor: Pisin Chen, (World Scientific, Singapore, 1999), pp. 682–694.*
  
- Sameen A. Khan,  
**Quantum aspects of accelerator optics,**  
*en: Proceedings of the 1999 Particle Accelerator Conference PAC99,*  
*(29 March – 02 April 1999, New York City, NY), Editores: A. Luccio y W. MacKay,*  
*(IEEE Catalogue Number: 99CH36366) pp. 2817–2819.*
  
- Sameen A. Khan y M. Pusterla,  
**Quantum mechanical aspects of the halo puzzle,**  
*en: Proceedings of the 1999 Particle Accelerator Conference PAC99*  
*(29 March – 02 April 1999, New York City, NY), Editores: A. Luccio y W. MacKay,*  
*(IEEE Catalogue Number: 99CH36366) pp. 3280–3281.*
  
- Sameen A. Khan y M. Pusterla,  
**Quantum-like approaches to the beam halo problem,**  
*en: Proceedings of the 6th International Conference on Squeezed States and Uncertainty Relations ICSSUR'99, (24–29 Mayo 1999, Napoli, Italy) (NASA Conference Publication Series).*
  
- Sameen A. Khan y M. Pusterla,  
**Beam currents in HIF,**  
*Por aparecer en: Proceedings of the 13th International Symposium on Heavy Ion Inertial Fusion HIF2000, (13–17 March 2000, San Diego, USA)*  
*Nuclear Instruments and Methods in Physics Research NIMS A.*  
*(sometido).*
  
- S. A. Khan,  
**Quantum formalism of beam optics,**  
*en: Proceedings of the 18th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics (15–20 Octubre 2000, Capri, Italy), Editor: Pisin Chen,*  
*(World Scientific, Singapore, 2001), pp. ???-???.*  
*(en prensa).*

### C. Artículos en preparación

- R. Jagannathan, S. A. Khan y R. Simon,  
**On the scalar wave theory of quasiparaxial beam optics.**

- R. Jagannathan, S. A. Khan y R. Simon,  
**On the Maxwell optics of quasiparaxial beams.**
- M. Conte, R. Jagannathan, S. A. Khan y M. Pusterla,  
**A quantum mechanical formalism for studying the transport of Dirac-particle beams through magnetic optical elements in accelerators.**

### OTROS ESCRITOS

- Sameen A. Khan,  
**The International Center for Theoretical Physics—A Personal Impression,**  
*Al-Nahl, Número especial sobre el Dr. Abdus Salam, 8*, pp. 122–124 (Otoño 1997).  
(**Al-Nahl**: A quarterly publication of Majlis Ansarullah, USA).
- Sameen Ahmed Khan,  
**Call for Creation of Accelerator & Beam Physics Forums,**  
*ICFA Beam Dynamics Newsletter, 17*, pp. 5–6 (Agosto 1998).  
(**ICFA**: International Committee for Future Accelerators).
- Sameen Ahmed Khan and Modesto Pusterla,  
**Call for Creation of Accelerator & Beam Physics Division**  
(in the European Physical Society),  
(*comunicado*).
- Sameen Ahmed Khan,  
**Salam's Bright Idea,**  
*Carta en Physics World, 12* (11), pp. 15 (Noviembre 1999).
- Sameen Ahmed Khan,  
**Salam Inspired Plans for Mideast Synchrotron,**  
*Carta en Physics Today, 53* (1), pp. 78 (Enero 2000).
- Sameen Ahmed Khan,  
**Opening SESAME,**  
*Carta en CERN Courier, 40* (3), pp. 38 (Abril 2000).  
(**CERN**: European Organization for Nuclear Research).
- Sameen Ahmed Khan,  
**Jordan to host Middle East Synchrotron,**  
*ICFA Beam Dynamics Newsletter, 22*, pp. 6–7 (Agosto 2000).  
(**ICFA**: International Committee for Future Accelerators).
- Sameen Ahmed Khan, **SESAME: The First Synchrotron Facility in the Middle East,**  
*AAPPS Bulletin, 10* (2), pp. 36–39 (Diciembre 2000).  
(**AAPPS**: Association of Asia Pacific Physical Societies).

- Sameen Ahmed Khan,  
**The Middle East Synchrotron Laboratory and India,**  
*Current Science*, **80** (2), pp. 130–132 (25 Enero 2001).
- Sameen Ahmed Khan,  
**The Story of the Relocated Synchrotrons,**  
*Indian Science Cruiser*, **15**, No. 2, 26–30 (Abril 2001).
- Sameen Ahmed Khan,  
**The World of Synchrotrons,**  
(*en prensa*).

### Actividades Académicas

- 07–15 Noviembre 1993  
**The CERN Accelerator School: Physics & Engineering for Particle Accelerators,**  
*Tuvo lugar en:* Centre for Advanced Technology (CAT), Indore, India.
- 25–27 Noviembre 1993  
**3rd National Seminar on Physics and Technology of Particle Accelerators and their Applications PATPAA-93.** *Tuvo lugar en:* IUC-DAEF, Kolkata (Calcutta) Centre, India,  
*Poster:* Theory of relativistic electron beam transport based on the Dirac equation.
- 17–29 Marzo 1994  
**JSPS-KEK International Spring School: High Energy Ion Beams—Novel Beam Techniques and their Applications,** *Tuvo lugar en:*  
National Laboratory for High Energy Physics (KEK)  
Institute of Nuclear Study (INS)  
Institute of Physical and Chemical Research (RICKEN)  
*Conferencia:* Quantum mechanics of charged particle beam optics: An operator approach.
- 23 Enero – 10 Febrero 1995  
**SERC School\* on Coherence and Correlations in Modern Optics and Quantum Physics,**  
*Tuvo lugar en:* The Institute of Mathematical Sciences, Chennai (Madras), India  
*Conferencia:* Charged Particle Optics — A Wigner function approach.
- 10–12 Noviembre 1995  
**61st Annual Meeting of Indian Academy of Science,**  
*Tuvo lugar en:* Chennai (Madras), India.

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\* Actively involved in capacity as the Member of the Local Organizing Committee and Publicity Secretary

- 22–23 Agosto 1996  
**Young Physicists Colloquium,**  
*Organizado por:* The Indian Physical Society (**IPS**), Kolkata (Calcutta), India,  
*Conferencia:* **Beam optics of the Dirac particle.**
  
- 10–15 Enero 1997  
**International Conference on Dynamical Systems,**  
*Tuvo lugar en:* The Indian Institute of Science, Bangalore, India,  
*Poster:* **Transport of Dirac-particle beams through magnetic quadrupoles.**
  
- 13–25 Enero 1997  
**School on Physics of Beams,**  
*Tuvo lugar en:* Centre for Advanced Technology (**CAT**), Indore, India,  
*Conferencia:* **Beam optics of the Dirac particle.**
  
- 03–21 Marzo 1997  
**Winter College on Quantum Optics: Novel Radiation Sources,**  
*Tuvo lugar en:* International Centre for Theoretical Physics (**ICTP**), Trieste, Italia,  
*Conferencia:* **Quantum mechanical approach to beam physics.**
  
- 25–27 Marzo 1997  
Istituto Nazionale di Fisica Nucleare (**INFN**),  
Sezione di Padova, Padova, Italia.
  
- 19–22 Noviembre 1997  
**Salam Memorial Meeting**  
*Tuvo lugar en:* The Abdus Salam International Centre for Theoretical Physics (**ICTP**), Trieste, Italia.
  
- 09–13 Diciembre 1997  
Istituto Nazionale di Fisica Nucleare (**INFN**),  
Sezione di Naples, Naples, Italia.
  
- 04–09 Enero 1998  
**15th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics,**  
Monterey, California, USA,  
*Conferencia:* **Quantum theory of magnetic quadrupole lenses for spin- $\frac{1}{2}$  particles.**
  
- 12–14 Enero 1998  
Center for Beam Physics,  
Ernest Orlando Lawrence Berkeley National Laboratory (**LBNL**),  
University of California, Berkeley, USA.
  
- 19–30 Enero 1998  
**US Particle Accelerator School USPAS,**  
University of Texas at Ausin, Austin, USA.

- 13–15 Mayo 1998  
**Workshop on Non-Linear Problems in Charged-Particle Beam Transport in Linear and Recirculated Accelerators, Analysis of Transverse and Longitudinal Instabilities,**  
*Tuvo lugar en:* Italian National Agency for New Technology, Energy and Environment (**ENEA**),  
Frascati, Italia,  
*Conferencia:* **Quantum methodology in beam physics.**
- 28 Junio – 05 Julio 1998  
Deutsches Elektronen-Synchrotron (**DESY**),  
Hamburg, Alemania.
- 09–10 Noviembre 1998  
Fermi National Accelerator Laboratory (**Fermilab**),  
Batavia, Illinois, USA.
- 12–13 Noviembre 1998  
Brookhaven National Laboratory (**BNL**),  
Upton, New York, USA.
- 20–26 Marzo 1999  
**Centennial Meeting of the American Physical Society,**  
*Tuvo lugar en:* Atlanta, Georgia, USA,  
*Conferencia:* **Quantum aspects of charged-particle beam optics.**
- 29 Marzo – 02 Abril 1999  
**1999 Particle Accelerator Conference (PAC99),**  
*Tuvo lugar en:* New York City, USA,  
*Poster-I:* **Quantum aspects of accelerator optics,**  
*Poster-II:* **Quantum mechanical aspects of the halo puzzle.**
- 24–29 Mayo 1999  
**6th International Conference on Squeezed States and Uncertainty Relations (ICSSUR'99),**  
*Tuvo lugar en:* Dipartimento di Scienze Fisiche, Università di Napoli “Federico II”, Napoli, Italia,  
*Poster:* **Quantum-like approaches to the beam halo problem.**
- 15–17 Diciembre 1999.  
**National Laser Symposium (NLS-1999),**  
*Tuvo lugar en:* School of Physics, University of Hyderabad,  
Hyderabad, India.
- 29 Enero – 29 Febrero 2000  
The Institute of Mathematical Sciences (**Matscience**),  
Chennai (Madras), India.
- 15–20 Octubre 2000  
**18th Advanced ICFA Beam Dynamics Workshop on Quantum Aspects of Beam Physics,**

Capri, Italia,  
*Conferencia:* **Quantum formalism of beam optics.**

- 21–26 Octubre 2000  
Dipartimento di Fisica,  
Università di Salerno,  
Salerno, Italia.
- 23 Octubre 2000  
**Mini Workshop on Quantum Methodologies in Beam Physics,**  
*Tuvo lugar en:* Dipartimento di Fisica,  
Università di Salerno,  
Salerno, Italia,  
*Conferencia:*
- 18–22 Diciembre 2000  
**XIV DAE Symposium on High Energy Physics,**  
*Tuvo lugar en:* School of Physics,  
University of Hyderabad,  
Hyderabad, India.

## MEMBRESÍAS ANUALES

- **American Physical Society**
  - The Division of Atomic, Molecular, and Optical Physics (DAMOP)
  - The Division of Physics of Beams (DPB)
  - Forum on Education (FEEd)
  - Forum on International Physics (FIP)
- **European Physical Society**
  - Quantum Electronics and Optics Division
  - Interdivisional Group on Accelerators
- **International Association of Mathematical Physics**
- **International Radiation Physics Society**
- **Società Italiana di Fisica**

- **Astronomical Society of India**

### MEMBRESÍAS PERMANENTES

- **Indian Physical Society**

*IPS*

Membresía permanente No. IPS/LM/95

Department of Material Science

Indian Association for Cultivation of Science

Jadavpur

**KOLKATA (CALCUTTA) 700032**

- **Indian Physics Association**

*IPA*

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- **Optical Society of India**

*OSI*

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Department of Applied Physics

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**KOLKATA (CALCUTTA) 700009**

- **Indian Laser Association**

*ILA*

Membresía permanente No. LM/348

Laser Research & Development Block-B

Centre for Advanced Technology (CAT)

Post: CAT Rajendranagar

**INDORE 452013**

- **Materials Research Society of India**

*MRSI*

Membresía permanente No. L 1069

Defence Metallurgical Research Laboratory

P.O Kanchanbagh

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- **Indian Society of Atomic and Molecular Physics *ISAMP***  
Membresía permanente No.  
Physical Research Laboratory *PRL*  
Navrangpura  
**AHMEDABAD 380009**
- **Indian Association of Physics Teachers**  
*IAPT*  
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- **Indian Society for Technical Education**  
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- **Plasma Science Society of India**  
*PSSI*  
Membresía permanente No. L-415  
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- **Indian Association for General Relativity and Gravitation *IAGRG***  
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- **Electrochemical Society of India**  
*ECST*  
Life Fellow Membership No. F-214  
Indian Institute of Science Campus  
**BANGALORE 560012**
- **Solar Energy Society of India**  
*SESI*  
Membresía permanente No. 0949/LM/2000  
Tata Energy Research Institute  
Darbari Seth Block  
Habitat Place, Lodhi Road

**NEW DELHI 110003**

- **Magnetics Society of India**  
*MSI*  
Membresía permanente No. LM-211  
Defence Metallurgical Research Laboratory  
P.O Kanchanbagh  
**HYDERABAD 500258**
  
- **Forum of Scientists, Engineers & Technologists *FOSET***  
Membresía permanente No. LM/2001-1187  
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- **Indian Science Congress Association**  
*ISCA*  
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- **Institute of Science, Education & Culture**  
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- **Ramanujan Mathematical Society**  
*RMS*  
Membresía permanente No.  
Ramanujan Institute for Advanced Studies in Mathematics  
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- **Society for Special Functions and their Applications *SSFA***  
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- **Indian Academy of Mathematics**  
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- **Association of Mathematics Teachers of India *AMTI***

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- **Indian Statistical Institute**

*ISI*  
Membresía permanente No. L/7827  
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- **Indian Statistical Association**

*ISA*  
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University of Poona  
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- **Operational Research Society of India**

*ORSI*  
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**KOLKATA (CALCUTTA) 700029**

- **Computer Society of India**

*CSI*  
Membresía permanente No. 00059965  
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**MUMBAI (BOMBAY) 400025**

- **The Society for Progress of Science**

*SPS*  
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Pragati Prakashan  
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**MEERUT 250001**

- **Indian Adult Education Association**

*IAEA*

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**NEW DELHI 110002**

- **Regional Science Association**

*RSA*

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- **All India Association for Educational Research** *AIAR*

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- **Indian Library Association**

*ILA*

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- **Indian Association of Special Libraries & Information Centres** *IASLIC*

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**KOLKATA (CALCUTTA) 700054**

- **All India Muslim Educational Society**

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**CHENNAI (MADRAS) 600034**

- **The Muslim Association for the Advancement of Science** *MAAS*

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- **Indian Association of Muslim Social Scientists *IAMSS***

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- **Indian Association for Islamic Economics**

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