

ASAD NIAZI, Ph.D.

Assistant Professor, Dept. of Physics
Faculty of Natural Sciences, Jamia Millia Islamia
New Delhi – 110025, India.
Phone: 91-11-26984631, *Email:* aniazi@jmi.ac.in,

EDUCATION

Ph.D., Physics, Jawaharlal Nehru University, New Delhi, 2000.
Ph.D. Thesis: Structural and Electronic Properties of Pure and Ga-Intercalated NbS₂.
Supervisor: Prof. Ashok K. Rastogi

M.Sc., Physics, Delhi University, Delhi, 1993.

B.Sc. (Hons.), Physics, Delhi University, Delhi, 1990.

APPOINTMENTS**July 2001 – Present (On postdoctoral leave, Nov. 2003 – Oct. 2007):**

Assistant Professor, Dept. of Physics, Faculty of Natural Sciences, Jamia Millia Islamia (Central University), New Delhi, India.

April 2008 – July 2008:

Visiting Scientist, Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany
(*Collaborator:* Dr. Bella Lake)

Nov. 2003 – Oct. 2007:

Postdoctoral Research Associate, Ames Laboratory, US DOE, and Dept. of Physics and Astronomy, Iowa State University, Ames, Iowa, USA.
(*Supervisor:* Prof. David C. Johnston)

July 2000 – June 2001:

Postdoctoral Visiting Fellow, Dept. of Condensed Matter Physics, TIFR, Mumbai, India.
(*Supervisor:* Prof. E. V. Sampathkumaran)

Nov. 1999 – June 2000:

Postdoctoral Research Associate, Magnetism Laboratory, UGC-DAE Consortium for Scientific Research, Indore, India (formerly Inter-University Consortium for DAE Facilities (IUC-DAEF)).
(*Supervisor:* Dr. Alok Banerjee)

July 1993 – July 1999:

Ph.D. Research Scholar, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India.
CSIR Senior Research Fellow, 1995 – 1998.
CSIR Junior Research Fellow, 1993 – 1995.
(*Supervisor:* Prof. Ashok K. Rastogi)

RESEARCH**Current Interests:**

- Synthesis and study of structural and electronic properties of known as well as new /novel transition metal compounds, mainly oxides and chalcogenides.
- Doping and iso-electronic substitution to study order-disorder behavior, and search for insulator-metal transitions.
- Understanding the role of disorder and dimensionality in influencing the properties of these strongly correlated, d- and f-band systems.

Synthesis and measurement techniques:

- Polycrystalline synthesis by solid state route, arc-melting, and soft-chemistry.
- Single crystal growth using flux, vapor transport, triarc pulling, optical float zone furnace.
- Thin film / templated growth to control dimensionality.
- X-ray diffraction, neutron scattering (in collaboration), SEM, titration, magnetization, NMR (in collaboration), electrical transport, thermoelectric power, and heat capacity in the temperature range 2 – 500 K.

Systems studied:**April 2008 – July 2008:**

Visiting Scientist, Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany

(Collaborator: Dr. Bella Lake)

- Spin-chain and vacancy-ordered hyperkagome vanadates and cuprates.

Nov. 2003 – Oct. 2007:

Postdoctoral Research Associate, Ames Laboratory US-DOE, Ames, Iowa, USA.

(Supervisor: Prof. D. C. Johnston)

- Zig-zag spin-chain oxides CaV_2O_4 , $\text{Ca}_{1-x}\text{Na}_x\text{V}_2\text{O}_4$: Single-crystal and poly-crystalline synthesis, structural, magnetic and thermal properties, hole-doping, bond-valence disorder induced spin-glass behavior.
- Oxygen deficient pyrochlore $\text{Lu}_2\text{V}_2\text{O}_{7-x}$: Evolution of structure and magnetism with oxygen content (x), magnetic granularity and cluster spin-glass behavior for large x .
- Vanadyl borate $(\text{Li}_x\text{V}_{1-x})_3\text{BO}_5$ ($x = 0.33$): Structure and magnetism – spin-glass behavior due to Li–V disorder.
- The $\text{Li}_2\text{O–V}_2\text{O}_3\text{–V}_2\text{O}_5$ system: Phase relationships at 700 °C, and crystal growth and magnetism of heavy Fermion LiV_2O_4 .
- Layered borides OsB_2 and RuB_2 : Crystallography, magnetism and NMR studies of the superconducting and normal states.
- MV_4O_8 ($M = \text{Lu}, \text{Y}$): Synthesis and physical properties of defect ordered CaFe_2O_4 structures.

July 2001 – Oct 2003, Present (On leave, Nov. 2003 – Oct. 2007):

Assistant Professor, Dept. of Physics, Jamia Millia Islamia, New Delhi, India.

(In collaboration with Prof. A. K. Rastogi, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India)

- Vacancy ordered, T_4 -clustered, chalcogenide spinels $\text{M}_x\text{T}_4\text{X}_8$ ($M = \text{Ga}, \text{Al}$; $T = \text{V}, \text{Nb}, \text{Ta}, \text{Mo}$; $X = \text{S}, \text{Se}, \text{Te}$): Coulomb-interaction effects in electron transport and magnetism.

July 2000 – June 2001:

Postdoctoral Visiting Fellow, Dept. of Condensed Matter Physics, TIFR, Mumbai, India.

(Supervisor: Prof. E. V. Sampathkumaran)

- Triangular spin-chain oxides $\text{A}_3\text{M}'\text{MO}_6$ ($A = \text{Alkaline Earth Sr/Ca/Ba}$; $M/M' = \text{Magnetic/non-magnetic metal Cu, Zn, Ir, Pt, Fe, Co, Rh}$): Single-crystal and polycrystalline synthesis, low dimensional magnetism – spin-frustration, magnetic phase separation, partially-disordered antiferromagnetism.

Nov. 1999 – June 2000:

Postdoctoral Research Associate, Magnetism Laboratory, UGC-DAE Consortium for Scientific Research, Indore, India.

(Supervisor: Dr. Alok Banerjee)

- Doped rare-earth manganites $\text{La}_{1-x}\text{Sr}_x\text{Mn}_{1-y}\text{Al}_y\text{O}_3$: Stoichiometry driven electronic phase separation effects in electron transport and magnetism.

July 1993 – July 1999:

Ph.D. Research Scholar, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India.

(Supervisor: Prof. A. K. Rastogi)

- Layered, intercalated, transition metal dichalcogenides M_xTX_2 , (M = Ga, Al; T = V, Nb, Ta, Mo; X = S, Se, Te): Single crystal and polycrystalline synthesis, intercalation and disorder, charge density waves, Coulomb-interaction effects in electron transport and magnetism.

TEACHING**July 2001 – Oct. 2003, Nov 2007 – Present (On leave, Nov. 2003 – Oct. 2007):**

Assistant Professor, Dept. of Physics, Faculty of Natural Sciences, Jamia Millia Islamia, New Delhi, India.

- Atomic and Molecular Physics (M.Sc.(2nd yr): 2008–09, 09–10, 10–11, (3rd sem): 11–12)
- Optics (B.Sc.(2nd yr): 2007–08, 2008–09, 09–10, 10–11)
- Atomic and Molecular Physics (B.Sc.(3rd yr): 2007–08)
- Electromagnetic theory (B.Sc.(3rd yr): 2001–02, 02–03).
- Laser spectroscopy and modern optics (M.Sc.(2nd yr), 2001–02).
- Structure of matter (B.Sc.(3rd yr): 2002–03).
- B.Sc. and M.Sc. Laboratories (2001–03, 2007–12).

PUBLICATIONS

Published/accepted in refereed journals:

1. Magnetic, thermal, and transport properties of the mixed valent vanadium oxides LuV_4O_8 and YV_4O_8 : S. Das, **A. Niazi**, Y. Mudryk, V. K. Pecharsky, and D. C. Johnston, *Phys. Rev. B*, **81**, 104432 (2010).
2. Magnetic Structure and Interactions in the Quasi-1D Antiferromagnet CaV_2O_4 : O. Pieper, B. Lake, A. Daoud-Aladine, M. Reehuis, K. Prokeš, B. Klemke, K. Kiefer, J. Q. Yan, **A. Niazi**, D. C. Johnston, and A. Honecker, *Phys. Rev. B*, **79**, 180409(R) (2009).
3. Single crystal synthesis, magnetic susceptibility, heat capacity and thermal expansion of CaV_2O_4 containing $S = 1 J_1 - J_2$ antiferromagnetic spin chains: **A. Niazi**, D. L. Schlagel, T. A. Lograsso, J. Q. Yan, S. Budko, R. W. McCallum, M. Reehuis, O. Pieper, B. Lake, A. Honecker, and D. C. Johnston, *Phys. Rev. B* **79**, 104432 (2009).
4. ^{17}O and ^{51}V NMR study of the zig-zag spin-1 chain compound CaV_2O_4 : X. Zong, B. J. Suh, **A. Niazi**, J. Q. Yan, D. L. Schlagel, T. A. Lograsso, D. C. Johnston, *Phys. Rev. B* **77**, 014412 (2008).
5. Superconducting and normal state properties of the layered boride OsB_2 : Y. Singh, **A. Niazi**, M. W. Vannette, R. Prozorov, D. C. Johnston, *Phys. Rev. B* (*accepted for publication*), arXiv:cond-mat/0612605.
6. ^{11}B NMR in the layered diborides OsB_2 and RuB_2 , by B. J. Suh, X. Zong, Y. Singh, **A. Niazi**, D. C. Johnston. *Phys. Rev. B* **76**, 144511 (2007).
7. Synthesis, structure, and ferromagnetism of the oxygen defect pyrochlore system $\text{Lu}_2\text{V}_2\text{O}_{7-x}$ ($x = 0.40 - 0.65$) by G. T. Knoke, **A. Niazi**, J. M. Hill, D. C. Johnston, *Phys. Rev. B* **76**, 054439 (2007).
8. Structure, magnetization, and NMR studies of the spin-glass compound $(\text{Li}_x\text{V}_{1-x})_3\text{BO}_5$ ($x \approx 0.40$ and 0.33) by X. Zong, **A. Niazi**, F. Borsa, X. Ma, D. C. Johnston, *Phys. Rev. B* **76**, 054452 (2007).
9. Crystallography, magnetic susceptibility, heat capacity, and electrical resistivity of heavy-fermion LiV_2O_4 single crystals grown using a self-flux technique by S. Das, X. Zong, **A. Niazi**, A. Ellern, J. Q. Yan, D. C. Johnston, *Phys. Rev. B* **76**, 054418 (2007).
10. Phase Relations in the $\text{Li}_2\text{O}-\text{V}_2\text{O}_3-\text{V}_2\text{O}_5$ System at 700 °C: Correlations with magnetic defect concentration in heavy fermion LiV_2O_4 : S. Das, X. Ma, X. Zong, **A. Niazi**, and D. C. Johnston, *Phys. Rev. B* **74**, 184417 (2006).
11. Evidence for the coexistence of low-dimensional magnetism and long-range order in $\text{Ca}_3\text{CoRhO}_6$: M. Loewenhaupt, W. Schäfer, **A. Niazi** and E. V. Sampathkumaran, *EuroPhys. Lett.* **63**, 374 (2003).
12. Superparamagnetic-like ac susceptibility behavior in a ‘partially disordered’ antiferromagnetic compound, $\text{Ca}_3\text{CoRhO}_6$: E. V. Sampathkumaran and **Asad Niazi**, *Phys. Rev. B* **65**, 180401(R) (2002).
13. The growth of a single crystal of $\text{Sr}_3\text{CuIrO}_6$ and its magnetic behavior compared to polycrystals: **Asad Niazi**, E. V. Sampathkumaran, P.L. Paulose, Ute. Ch. Rodewald, and W. Jeitschko, *Pramana – J. Phys.* **58**, 1069 (2002).
14. Peak effect studies in single crystals CeRu_2 and $2\text{H}-\text{NbS}_2$: A. A. Tulapurkar, A. K. Grover, S. Ramakrishnan, **A. Niazi** and A. K. Rastogi, *Pramana – J. Phys.* **58**, 975 (2002).
15. Inhomogeneous magnetism in single crystalline $\text{Sr}_3\text{CuIrO}_{6+\delta}$: Implications to phase-separation concepts: **Asad Niazi**, P. L. Paulose, and E. V. Sampathkumaran, *Phys. Rev. Lett.* **88**, 107202 (2002).
16. Magnetic anomalies in the spin-chain system, $\text{Sr}_3\text{Cu}_{1-x}\text{Zn}_x\text{IrO}_6$: **Asad Niazi**, E.V. Sampathkumaran, P.L. Paulose, D. Eckert, A. Handstein, and K.-H. Müller, *Phys. Rev. B* **65**, 064418 (2002).

17. $\text{Sr}_3\text{CuIrO}_6$, a spin-chain compound with random ferromagnetic and antiferromagnetic interactions: **Asad Niazi**, E.V. Sampathkumaran, P. L. Paulose, D. Eckert, A. Handstein, and K.-H. Müller, Solid State Commun. **120**, 11 (2001).
18. Magnetic characteristics of $\text{Sr}_3\text{Cu}_{1-x}\text{Zn}_x\text{IrO}_6$; a spin-chain system with competing interactions: **Asad Niazi**, E. V. Sampathkumaran, P. L. Paulose, D. Eckert, A. Handstein and K.-H. Müller, Physica B **312 – 313**, 632 (2002) .
19. Peak Effect Studies in NbS_2 : A. A. Tulapurkar, A. K. Grover, S. Ramakrishnan, **A. Niazi** and A. K. Rastogi, Physica B **312 – 313**, 118 (2002).
20. Low temperature resistance minimum in non-superconducting 3R-NbS_2 and $3\text{R-Ga}_x\text{NbS}_2$: **A. Niazi** and A.K. Rastogi. Journal of Physics: Condensed Matter **13**, 6787 (2001).
21. A precision, low-cost vibrating sample magnetometer: **A. Niazi**, P. Poddar, A. K. Rastogi, Current Science, **79**, 99 (2000).
22. Transport properties of V_4 and Mo_4 -cluster compounds: An electron glass? : A. K. Rastogi and **Asad Niazi**, Physica B **223 & 224**, 588 (1996).
23. Weak localization effects in Ga-intercalated layered compound NbS_2 : **Asad Niazi** and A. K. Rastogi, Physica B **223 & 224**, 591 (1996).

PRESENTATIONS

Talks:

1. X-Ray Diffraction,
15 Feb, 2011, Academic Staff College, JNU, New Delhi.
2. The Oxygen defect pyrochlore $\text{Lu}_2\text{V}_2\text{O}_{7-x}$,
AMRU, SNB-NCBS, Kolkata, 11 Oct, 2010.
3. The Oxygen defect pyrochlore $\text{Lu}_2\text{V}_2\text{O}_{7-x}$,
SERC Summer School in Solid State and Materials Chemistry, SSCU, IISc, Bagalore, 07 July 2010.
4. Using Free/Open-source software for modelling atomic structures and crystallography,
Application of Free / Open Source Software(FOSS) In Science Teaching and Research, Acharya Narendra Dev College, Delhi University (in association with NRC-FOSS, Anna University, Chennai, India), 14-15 April, 2010.
5. Hole-doping of $\text{Ca}_{1-x}\text{Na}_x\text{V}_2\text{O}_4$ ($x = 0 - 0.5$) with zig-zag vanadium chains,
Annual March Meeting of The American Physical Society, Denver, Colorado, USA, 06 Mar, 2007.
6. Magnetic susceptibility and heat capacity of single crystal CaV_2O_4 containing $S = 1 J_1$ - J_2 antiferromagnetic spin chains,
Annual March Meeting of The American Physical Society, Baltimore, Maryland, USA, March 13, 2006.
7. Exploring the spin-chain oxides $\text{A}_3\text{A}'\text{MO}_6$,
Annual March Meeting of The American Physical Society, Montreal, Canada, March 22, 2004.
8. Magnetism in some spin-chain compounds, (*Invited*)
Prof. M. Salamon's group, Dept. of Physics, University of Illinois at Urbana Champaign, Champaign, Illinois, USA, May 05, 2003.
9. Magnetism in the spin chain compound $\text{Sr}_3\text{CuIrO}_6$, (*Invited*)
SPS Alumni Meeting, School of Physical Sciences, JNU, New Delhi, India, March 09, 2002.
10. Magnetic characteristics of an oxide system, $\text{Sr}_3\text{Cu}_{1-x}\text{Zn}_x\text{IrO}_6$ with competing interactions and low dimensionality,
Mini-workshop on 'Frontiers in Material Science', ICTP, Trieste, Italy, May 18, 2001.

11. Structural and electronic properties of Pure and Ga-intercalated NbS₂, (*Invited*)
Dept. of Condensed Matter Physics and Material Science, TIFR, Mumbai, India, Dec. 15, 1999.
12. Structural and electronic properties of Pure and Ga-intercalated NbS₂, (*Invited*)
Solid State Physics Division, BARC, Mumbai, India, Dec. 13, 1999.

Posters:

1. The Zig-Zag Spin Chain Antiferromagnet CaV₂O₄: Synthesis, Structure and Magnetism,
Intl. Conf. on Quantum Effects in Solids of Today, 20–23 Dec, 2010, NPL, New Delhi.
2. Antiferromagnetic and structural transitions in the frustrated spin $S = 1$ zig-zag chain compound
CaV₂O₄,
US DOE Condensed Matter Physics Program Review, Ames Laboratory, Ames, Iowa, USA, May 10,
2007.
3. Ferromagnetic insulating behavior in Mn⁴⁺ rich La_{0.9}Sr_{0.1}Mn_{1-x}Al_xO_{3+δ}: Evidence for electronic
phase separation?,
Summer College and Conference on ‘Physics and Chemistry of Rare Earth Manganites’, ICTP, Trieste,
Italy, June 18, 2003.
4. Magnetic behaviour of single crystalline Sr₃CuIrO₆ with quasi-one-dimensional magnetic chains,
International Symposium on Advances in Superconductivity and Magnetism: Materials, Mechanisms
and Devices (ASMM2D-2001), TIFR & Mangalore University, Mangalore, India, Sept. 26, 2001.
5. Magnetic characteristics of an oxide system, Sr₃Cu_{1-x}Zn_xIrO₆ with competing interactions and low
dimensionality,
Summer School on ‘Trends in High Magnetic Field Science’, Institut D’études Scientifiques de Cargèse,
Cargèse, Corsica, France, May 11, 2001.
6. Weak localization effects in Ga-intercalated layered compound NbS₂,
International Conference on Strongly Correlated Electron Systems (SCES), Goa, India, Sept. 1995.

Other workshops/ conferences attended:

1. International School/Conference on Functional Materials, HRI, Allahabad, 28 Mar – 01 Apr, 2011.
2. SERC Summer School in Solid State and Materials Chemistry, SSCU, IISc, Bangalore, 17 Jun – 07
Jul, 2010.
3. Strongly Correlated Electron Systems, Jawaharlal Nehru University, New Delhi, India, Feb. 1997.
4. Workshop on Highly Correlated Electron Systems and Electron Localization Effects, (UGC–DAE Con-
sortium for Scientific Research (formerly IUC–DAEF), Indore, India, March 1994.

MEMBERSHIP OF PROFESSIONAL SOCIETIES

- American Physical Society