Abid Hussain

: https://www.researchgate.net/profile/Abid-Hussain-49

Kupwara, India
(+91)-6005104668
aabidhussaini786@gmail.com

Educational Background

1. **Ph.D. Physics,** *Specialization: Materials Science. (2018-23)*

   Thesis title: "Radiation Response of Single-Phase Multicomponent Transition Metal Based Alloys"

   Inter-University Accelerator Center, New-Delhi, 110067, India

2. **M.Sc. Physics,** *Specialization: Laser and Spectroscopy. (2014-16)*

   Department of Physics & Astrophysics, University of Delhi, New-Delhi India

3. **B.Sc. (Hons.)** *Physics, (2012-14)*

   Major Subjects*: Physics, Mathematics and Chemistry.*

   Department of Physics, Aligarh Muslim University, UP, 202002, India

Present Position

Assistant Professor, Department of Physics, Kupwara Campus, UoK.

Teaching Experience

Assistant Professor under the Academic Arrangement Program at University of Ladakh, India. 16/08/2023-02/04/2025

Research Experience

1. **Investigation of radiation stability of NiCoCrFePd high entropy alloy for nuclear reactor applications (Currently working)**

   Inter-University Accelerator Center, New-Delhi, 110067, India

   Advisors: Dr. S. K. Khan (IUAC) & Prof. Pawan K. Kulriya (JNU)

   - Studied the dynamic of the defects in NiCoCrFePd High Entropy Alloy samples under 1.05 MeV ion irradiation at different ion fluence. The dynamics of defects at different ion fluence is correlated with the resulting hardening behavior and the results have been reported in the reputed journal of MSEA.
   - The nature of defects produced by 120 MeV swift heavy ion (SHI) irradiation at different ion fluence is traced and subsequently correlated with the irradiation induced hardening behavior in NiCoCrFePd HEA.
   - Developing thin films of NiCoCrFePd HEA using e-beam evaporation technique and simulation the radiation response of NiCoCrFePd HEA thin film.

2. **Development of a ladder setup for high temperature irradiation/implantation in the low energy ion beam facility at IUAC.**

   Inter-University Accelerator Center, New-Delhi, 110067, India

3. **Operationalized t h e cryostat system with the D8 advanced XRD system to make low-temperature XRD measurement possible down to 15 K.**
Beam hall-2, Inter-University Accelerator Center, New-Delhi, 110067, India
Advisor: Dr. Saif A. Khan & Dr. Sanjay K. Kedia
Collaborators: Research group of Dr. Somen Karr, Cryogenic group, IUAC
- Installation of He-gas and temperature sensors in the cryostat to functionalize and calibration of temperature dependent XRD machine.
- Investigated the temperature dependent phase stability of the NiCoCrFePd HEA thin films and subsequently investigated its magneto-transport properties.

4. **Investigating the defects generated by the low energy and high energy irradiation using the positron annihilation technique**
Baba Atomic Research Center, Thrombay, Mumbai, 400088, India
Collaborator: Dr. Sandeep K. Sharma Scientist-G, BARC, Mumbai, India
- Quantitative detection of defects using positron annihilation Dopplers spectroscopy technique in irradiated samples with 1.05 MeV Xe^{+3} ion irradiation at different ion fluence.
- Qualitative identification of defects using the positron annihilation lifetime spectroscopic technique in irradiated samples with 120 MeV Au^{+9} irradiated at different ion fluence.

5. **Conduct of Pelletron Beam line experiment (User collaboration)**
Inter-University Accelerator Center, New-Delhi, 110067, India
Advisors: Dr. Saif. A. Khan & Prof. Pawan K. Kulriya
Collaborator: Indian space research organization (ISRO) India.
- Testing of various devices for their response in irradiation environment to simulate the device performance in space radiation environments.
- Involvement and handling of the high temperature irradiation experiments in Beam line-II at IUAC.

Journal Publications

Published Articles

1. **A. Hussain**, S. A. Khan, Anju Kumari, R. C. Meena, Sanjay K. Kedia, Deeksha Khandelwal, and P. K. Kulriya "Magneto-transport behavior of (111) oriented NiCoCrFePd high entropy alloy films" *Materials Today Physics*, 101644, DOI
2. **A. Hussain**, S. A. Khan, Sandeep K. Sharma, et al., "Swift Au+ 9 ion irradiation-induced defects and alloy complexity effect on the mechanical hardness of NiCoCrFePd HEA and NiCoCrFe MEA." *Journal of Applied Physics* (Vol. 136, no. 2, 2024), DOI
3. **A. Hussain**, S. Khan, S. K. Sharma, et al., "Influence of defect dynamics on the nano indentation hardness in NiCoCrFePd high entropy alloy under high dose Xe^{+3} irradiation, *Materials Science and Engineering: A*, vol. 863, p. 144 523, DOI
4. **A. Hussain**, R. Dhaka, H. J. Ryu, S. K. Sharma, and P. K. Kulriya, "A critical review on temperature dependent irradiation response of high entropy alloys," *Journal of Alloys and Compounds*, Vol. 624, p. 169, 2023, DOI

5. **A. Hussain**, S.A. Khan, Sandeep K. Sharma, et al., "Swift Au+9 ion irradiation-induced defects andalloy complexity effect on the mechanical hardness of NiCoCrFePd HEA and NiCoCrFe MEA" *Journal of Applied Physics*. (Vol. 135, no. 19, 2024), DOI
6. S. K. Sharma, V. Grover, R. Shukla, **A. Hussain**, A. Mishra, and P. K. Kulriya, "Response of nonstoichiometric pyrochlore composition $Nd_{1.8}Zr_{2.2}O_{7.1}$ to electronic excitations," *Journal of the American Ceramic Society*, vol. 107, no. 1, pp. 561–575, 2024. DOI
7. N. Saxena, R. Sharma, **A. Hussain**, et al., "Effect of the triple (al, ga, in) doping in ZNO nanostructures on its transmission, conductivity, and stability for TCO applications," *Materials Letters*, vol. 306, p. 130 886, 2022.DOI

Conference posters/presentations

1. Abid Hussain, R. S. Dhaka, Guru dutta, S. K. Sharma, "Synthesis and Characterization of $Ni_{0.55}Cr_{0.35}Mn_{0.1}$ based nearly equi-atomic alloy by arc melting technique" 5th International Conference on Nanostructuring by ion beams 6th – 8th November, 2019, IGCAR, Tamil Nadu. **(Poster Presentation)**
2. **Abid Hussain**, Saif Ahmad Khan, P. K. Kulriya, "Evaluation of damage in 1.05 MeV Xe ion irradiated NiCoCrFePd High Entropy Alloy" Joint ICTP-IAEA Virtual Workshop on Atomistic Modelling of Radiation Damage in Nuclear Systems, 4th – 8th, October 2021, Italy. **(Poster Presentation)**
3. **Abid Hussain**, Saif Ahmad Khan, Sanjay Kumar Kedia, Ramcharan Meena, P. K. Kulriya, "Tuning of metal to semiconducting transition temperature of e-beam evaporated NiCoCrFePd high entropy alloy films by annealing temperature" 15th Annual International Workshop on Advanced Materials, 19th – 21th, February 2022, United Arab Emirates. **(Poster Presentation)**
4. **Abid Hussain**, S.A. Khan, Sandeep K Sharma, Kathi Sudarshan, S.K. Sharma, P. K. Kulriya, "Effect of defect dynamics on the mechanical properties of NiCoCrFePd High Entropy Alloy under 1.05 MeV Xe^{+3} ions irradiation", 19th International Conference on Positron Annihilation, 22th – 26th, August 2022, Helsinki, Finland. **(Oral Presentation)**
5. **Abid Hussain**, S.A. Khan, Sandeep K. Sharma, Kathi Sudarshan, Sourabh K. Sharma, Chetan Singh, P. K. Kulriya, "Evaluation of low energy Xe-ion irradiation response of NiCoCrFePd high entropy alloy using PAS and TEM", 7th International Conference on Ion Beams in Materials Engineering and Characterization, 16th – 19th, November 2022, IUAC, New Delhi. **(Poster Presentation)**
6. **Abid Hussain**, P. K. Kulriya, Ambuj Mishra, Sanjay K. Kedia, Saif A. Khan, "Investigation of xenon bubble formation in xenon ion implanted NiCoCrFePd high entropy alloy film", International Conference on Electron Microscopy & XLI Annual Meeting of Electron Microscope Society of India, 8th – 10th, February 2023, Delhi University, New Delhi. **(Poster Presentation)**

Achievements

1. Best Poster Presentation Award, at Joint ICTP-IAEA Virtual Workshop on Atomistic Modelling of Radiation Damage in Nuclear Systems, (04-08) October 2021. (**Prize money 200 Euros**)
2. 2nd Best Poster Presentation Award, at 7th International Conference on Ion Beams in Materials Engineering and Characterization, (IBMEC) (16-19) November 2022. (**Prize money 1500 Rupees**)
3. Consolation Best Poster Presentation Award. at International Conference on electron microscopy & XLI annual meeting of electron microscope society of India (EMSI). (08-10) February 2023.
4. Graduated aptitude test for engineering, (GATE) 2016 Qualified, All India Rank, 1715
5. Joint CSIR-UGC Junior Research Fellowship & Eligibility for Lectureship (NET) Exam, 2017 and 2018 qualified All India Rank, 347 and 247.
6. State Eligibility Test (SET) 2016 of J& K in Physics, qualified.

Skills and Expertise

1. **Low Temperature XRD Setup:** Working and functionalization of the He cryostat system with the D8 advanced XRD system to make low-temperature XRD measurement possible down to 15 K in the beam hall-2 at IUAC.

2. **High Temperature Irradiation Setup**: I have designed and fabricated a high-temperature setup for high temperature irradiation up to 500 K in the Low-Energy Ion Beam Facility (LEIBF) at IUAC.

3. **Hydrogen Sensing XRD set up:** Operational experience in the measurement of XRD in the hydrogen environment 5% at different pressure using the in-situ XRD machine available at the beam line-2 IUAC.

4. **Arc Melting, & Ball Milling**: Operational experience in Arc melting systems and high-energy ball milling systems.

5. **E-beam Evaporation & Sputtering system:** Operational experience in E-beam Evaporation & Sputtering systems.

6. **TEM sample preparation & Characterization:** Operational experience in cross-sectional as well as planner sample preparation and TEM characterization.

7. **SEM Characterization:** Operational experience in SEM for microstructural characterization.

8. **Mechanical Characterization:** Experience in operating the nano-indenter machine for hardness measurement.

9. Coding: C++, FORTRAN, MATLAB and LaTeX

References

1. **Prof. Pawan Kumar Kulriya, Professor of Physics**
   School of Physical Sciences,
   Jawaharlal Nehru University, New Delhi, India.
   Ph.: +91-8800389872
   Email: pkkulriya@mail.jnu.ac.in, pawanjnu01@gmail.com

2. **Dr. Saif A. Khan, Scientist-G**
   Materials Science Group,
   Inter-University accelerator Center, New Delhi, India.
   Ph.: +91-9311810979
   Email: khansaifahmad@gmail.com

3. **Dr. Sandeep K. Sharma, Scientist-G**
   Babha Atomic Research Center, Mumbai, India.
   Ph.: +91- 9969510267
   Email: skumars@barc.gov.in, sandeep.airty@gmail.com