CURRICULUM VITAE

Dr. K VINOD KUMAR

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Department of Physics
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Academic Qualifications:

2022: ***Ph.D.*** **(Physics)**

School of Physics, University of Hyderabad, Hyderabad, Telangana, 500046, India.

Thesis Title: *"Electronic Excitation Induced Effects on the Structural and Electrical Properties of HfO_2 thin films"*

2013: ***M.Sc.*** **[Physics]**

School of Physics, University of Hyderabad, Gachibowli, Hyderabad, Telangana, 500046, India.

Positions Held:

Assistant Professor: (March 2024 – Present)
Department of Physics, School of Basic and Applied Sciences,
Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India.

Post-Doctoral Fellow: (July 2023 – March 2024)
School of Physics, University of Hyderabad, Hyderabad, Telangana, India.

Research Interest:

- High-k dielectric thin films
- Ferro-electric materials
- Electronic excitation induced phase transformations
- Electronic Materials and Devices
- Negative capacitance based Non-volatile memory devices

Academic awards / Honors / Fellowships / Achievements:

- Lifetime member of Ion Beam Society of India (IBSI).
- IoE Post-Doctoral Research Fellowship (IoE-PDRF), University of Hyderabad, Hyderabad, Telangana, India from July 2023 to March 2024.
- DST-SERB-ITS grant to attend 26th International Conference on the Application of Accelerators in Research and Industry and 53rd Symposium of Northeastern Accelerator Personnel (CAARI-SNEAP-2022) held at Denton, Texas, USA.
- Best Poster Award in International Conference on Nanostructuring by Ion Beams (ICNIB-2019) held at IGCAR, Tamilnadu, India.
- UGC – CSIR Scientific Research fellowship (JRF/SRF) in 2014.

Personal Profile:

Sex	Male	***Date of birth***	July 05, 1992
Marital Status/Family	Married	***Nationality***	Indian.

Journal Publications:

1. **K. Vinod Kumar**, J. Pundareekam Goud, Kanaka Ravi Kumar, K. C. James Raju, S. V. S. Nageswara Rao, "Laser Annealing of Au/HfO_2 bi-layers to Fabricate Au Nanoparticles without altering the Phase of HfO_2 for Applications in SERS and Memory Devices", *Journal of Materials Science: Materials in Electronics* **2022,** 33, 6657-6669. https://doi.org/10.1007/s10854-022-07840-7

2. **K. Vinod Kumar**, N. Arun, A. Mangababu, Sunil Ojha, S. V. S. Nageswara Rao, A. P. Pathak "120 MeV Ag ion irradiation induced intermixing, grain fragmentation in HfO_2/GaO_x thin films and consequent effects on the electrical properties of HfO_2/GaO_x/Si-based MOS capacitors", *Rad. Eff. Deff. In Sol.* **2020**, 175 (1-2), 150-159. https://doi.org/10.1080/10420150.2020.1718140

3. **K. Vinod Kumar**, N. Arun, A. P. Pathak, S. V. S. Nageswara Rao, "Effects of Thermal Annealing and Gamma Irradiation on HfO_2 Thin Films deposited on GaAs", *AIP Conf. Proc.* **2019**, 2115, 030021-1–030021-4. https://doi.org/10.1063/1.5112860

4. N. Arun, L.D. Varma Sangani, **K. Vinod Kumar**, A. Mangababu, M. Ghanashyam Krishna, A. P. Pathak, and S.V.S. Nageswara Rao, "Effects of swift heavy ion irradiation on the performance of HfO_2-based resistive random access memory devices", *Journal of Materials Science: Materials in Electronics*, **2022**, 32:2973–2986. https://doi.org/10.1007/s10854-020-05049-0

5. A. Mangababu, N. Arun, **K. Vinod Kumar**, A. P. Pathak, S. V. S. Nageswara Rao, "Metal nanoparticles in dielectric media: Physical vapor deposited HfO_2 & Ag multilayers for MOS device and SPR applications", *AIP Conf. Proc.* **2020**, 2265, 030271. https://doi.org/10.1063/5.0016821

6. M. Dhanunjaya, **K. Vinod Kumar**, N. Manikanthababu, S.V.S. Nageswara Rao, A.P. Pathak, "Swift heavy ion irradiation assisted Si nanoparticle formation in $HfSiO_x$ nano-composite thin films deposited by RF magnetron sputtering method", *Nuclear Inst. and Methods in Physics Research B* **2019**, 446, 37–42. https://doi.org/10.1016/j.nimb.2019.03.027

7. N. Arun, **K. Vinod Kumar**, A. Mangababu, S. V. S. Nageswara Rao, A. P. Pathak, "Influence of the bottom metal electrode and gamma irradiation effects on the performance of HfO_2-based RRAM devices", *Rad. Eff. and Def. in Sol*. **2019**, 174 (1-2), 66-75. https://doi.org/10.1007/s10854-020-05049-0

8. N. Arun, J. Prabana, **K. Vinod Kumar**, A. P. Pathak, S. V. S. Nageswara Rao, "Fabrication of HfO_2 based MOS and RRAM devices: A study of Thermal Annealing Effects on these Devices", *AIP Conf. Proc*. **2019**, 2115, 030216-1–030216-4. https://doi.org/10.1063/1.5113055

9. N. Arun, **K. Vinod Kumar**, A. P. Pathak, D. K. Avasthi, S. V. S. Nageswara Rao, "Hafnia based resistive switching devices for non-volatile memory applications and Effects of gamma irradiation on device performance", *Rad. Eff. Def. In Sol*. **2018**, 173 (3-4), 239-249. https://doi.org/10.1080/10420150.2018.1425863

Invited/Contributed Talks:

1. **K. Vinod Kumar**, N. Arun, A. Mangababu, Sunil Ojha, A. P. Pathak, S.V.S. Nageswara Rao, "Electronic excitation induced effects on the structural and electrical properties of HfO_2 thin films", *26th International Conference on the Application of Accelerators in Research and Industry and 53rd Symposium of Northeastern Accelerator Personnel (CAARI-SNEAP-2022), University of North Texas, USA* (Contributed Talk).

Oral/Poster Presentations:

2. **K. Vinod Kumar**, J. Pundareekam Goud, Kanaka Ravi Kumar, K. C. James Raju and S. V. S. Nageswara Rao, "Laser Annealing of Au/HfO_2 bi-layers to Fabricate Au Nanoparticles without altering the Phase of HfO_2 for Applications in SERS and Memory Devices", *Symposium on Electronics for Self-Reliance (SESR-2023), University of Hyderabad, India* (Poster presentation).
3. **K. Vinod Kumar**, N. Arun, A. Mangababu, Sunil Ojha, A. P. Pathak, S.V.S. Nageswara Rao, "Effects of Swift Heavy Ion irradiation on the structural and electrical properties of HfO_2 thin-films deposited on GaAs", *25th International Conference (online) on Ion Beam Analysis (IBA & PIXE – SIMS), 2021* (Poster presentation).
4. **K. Vinod Kumar**, N. Arun, A. Mangababu, Sunil Ojha, A. P. Pathak, S.V.S. Nageswara Rao, "Effects of Gamma and Swift Heavy Ion irradiation on the structural and electrical properties of HfO_2/GaO_x/Si based MOS structures", *International conference (online) on Ion Beams in Materials Engineering and Characterization (IBMEC-2020)* (Poster presentation).
5. **K. Vinod Kumar**, N. Arun, A. Mangababu, Sunil Ojha, A. P. Pathak, S.V.S. Nageswara Rao, "SHI irradiation induced grain fragmentation, crystallization of HfO_2 thin films and consequent effects on HfO_2-GaAs based MOS devices", *5th International Conference on Nano-structuring by Ion Beams (ICNIB-2019), IGCAR, Kalpakkam* (Poster presentation – **Best poster award**).
6. **K. Vinod Kumar**, N. Arun, A. Mangababu, A. P. Pathak, S.V.S. Nageswara Rao, "Gamma irradiation Effects on HfO_2/Ga_2O_3/Si and HfO_2/Si based MOS devices", *5th International conference on Ion Beams in Materials Engineering and Characterizations (IBMEC-2018), IUAC, New Delhi* (Poster presentation).
7. **K. Vinod Kumar**, N. Arun, A. P. Pathak, S.V.S. Nageswara Rao, "Effects of Thermal Annealing and Gamma Irradiation on HfO_2 Thin Films deposited on GaAs", 63rd DAE Solid State Physic Symposium (DAE-SSPS-2018), Guru Jambheswar University of Science & Technology, Hisar, Haryana (Poster presentation).
8. **K. Vinod Kumar**, N. Arun, A. P. Pathak, S.V.S. Nageswara Rao, "Effects of Thermal annealing and Gamma irradiation on HfO_2/GaAs based MOS devices", *International Conference on Sculptured Thin Films (GLAD-2018), IIT Delhi, New delhi* (Poster presentation).
9. **K. Vinod Kumar**, N. Arun, A. P. Pathak, S.V.S. Nageswara Rao, "Fabrication and characterization of HfO_2-based high-k dielectric thin films on high mobility semiconductors for MOS device applications", *National Conference on Physics at Small Scales and Advanced Materials (NCPSSAM-2017), University of Hyderabad, Hyderabad*. (Poster presentation).