

Inter-University Centre for Astronomy and Astrophysics  
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December 12, 2024

Dr. Vivian U  
Department of Physics and Astronomy  
University of California, Irvine  
Irvine, CA, USA

Dear Dr. U,

I am writing to express my interest in the postdoctoral position in your group at the University of California, Irvine. My research leverages state-of-the-art hydrodynamic cosmological simulations to explore the interplay between galaxy evolution, feedback processes, and dark matter haloes. These interests strongly align with the projects described in your NSF and NASA ADSPS programs, and I am eager to contribute to your group's research efforts while building expertise in generating mock observations and connecting simulations to observational data.

I am currently a Senior Research Scholar at IUCAA, where I recently submitted my PhD thesis under Prof. Aseem Paranjape. My work focuses on the astrophysical impact of galaxy formation on dark matter haloes, utilizing large-scale simulations such as IllustrisTNG, EAGLE, and CAMELS. I have direct experience in analyzing feedback-driven processes in simulations, particularly in understanding their effects on mass profiles and galaxy properties. Additionally, I have worked with Cloudy photoionization code and I have also worked with observations such as galaxy surveys. I am excited to build on my expertise further and generate mock catalogs and explore far-IR line properties in the context of your research program.

The opportunity to compare hydrodynamic simulations of multiphase feedback in galaxy mergers to IFU data is particularly exciting, as it aligns with my long-term interest in bridging theoretical models with observations. I am equally enthusiastic about exploring obscured AGN and dual/binary AGN systems using simulations to understand their evolution and observational signatures across cosmic epochs. My technical expertise and experience with simulations position me to contribute meaningfully to these projects while learning from your group's strengths in observational methodologies, including IFU data analysis and far-IR spectroscopy.

I am also passionate about fostering an inclusive academic environment and mentor undergraduate and master's students. I look forward to such mentorship activities as part of your group, contributing to both its scientific and educational missions.

Thank you for considering my application. I have included my CV, research statement, and publication list. I look forward to the opportunity to discuss how my background and research interests align with your group's goals and the broader astrophysics program at UC Irvine.

Sincerely,  
Premvijay Velmani,  
Senior Research Scholar,  
IUCAA Pune, India