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Physics Search Committee
Department of Physics
Texas Tech University
Lubbock, TX 79409

Application for the Assistant Professor Position

Dear Members of the Physics Search Committee,

Please consider me for the position of Assistant Professor. I am excited about the prospect of working at Texas Tech University as I feel that this position very much aligns with my interests and expertise and would allow me to contribute to the students and your renowned institution.

Currently, I am working as postdoctoral researcher at the University of California, Merced. In 2013 I earned my doctorate in experimental condensed matter physics at the University of Cincinnati and then worked as a postdoctoral researcher at the Ohio State University. Earlier, I completed my Master of Technology (M. Tech) in Materials Science from the Indian Institute of Technology, Kanpur one of the highly respected institutes in India. My teaching experience, combined with my excellent academic record and my dissertation titled *Optoelectronic Investigation of Single CdS Nanosheets and Single GaP/GaAs Nanowire Heterostructures,* makes me a strong candidate able to meet the needs of your department.

Teaching is the most important part of my life. I have more than ten years of teaching experience as both a classroom teacher and as a private mentor. During my undergraduate years, I mentored elementary and high school students in India to apply my passion for teaching. At the University of Cincinnati, I was a teaching assistant for seven years and taught numerous laboratory courses and calculus- and algebra-based recitation classes. These experiences provided me with the essential tools an effective teacher must have.

The most important thing I have learned as a teaching assistant at the University of Cincinnati is the value of using proven pedagogical methods and following research-based instructional strategies. Establishing and maintaining a collaborative and active learning atmosphere are the most satisfying techniques I learned while teaching calculus-based classes in Introductory Physics. This experience also introduced me to the importance of learning through practice and group discussion.

To combine my knowledge of physics and passion for teaching into effective teaching skills, I earned the Preparing Future Faculty certificate at the University of Cincinnati. The certificate work included a mix of classroom experiences (including 40 hours of in-class mentoring), five workshops, three reading groups (both as a participant and as a group leader), and two courses

in contemporary teaching techniques. This valuable program helped me to improve my teaching skills and further strengthened my teaching abilities. I strongly believe that my experiences as a teaching assistant and my familiarity with the latest innovative teaching techniques are valuable assets for an assistant professor of physics.

I have also taught several laboratory courses with an emphasis on using Internet-based learning techniques. These structured and open laboratory experiences ensured that students had access to basic and advanced learning technologies and to integrate various physical science concepts and critical thinking skills to solve real-world problems. In addition, I am a certified statistical analysis software (SAS) programmer and have instructed diverse groups of international students in SAS. I have designed Internet-based SAS courses that include live demonstrations, real time project exposure, and provide support to finish the projects on time.

I also have experience working with diverse groups of students. My view of diversity includes differences in culture, ethnicity, financial situations and responsibilities, and career goals. I understand that your institute welcomes many such students, and I would enjoy working with them.

While pursing my doctorate at the University of Cincinnati, I worked with many graduate students from Miami University in Oxford, Ohio and collaborated with them on their research projects. At Ohio State University and the University of California, Merced, I supervised graduate and undergraduate students and met with them on a regular basis. This included directing their research projects. I have always enjoyed their feedback. I have also offered suggestions to help expand the Physics department's core curriculum and have worked to build a direct connection between doing research and the department's core curriculum.

I have learned several techniques including material synthesis and characterization techniques during my Master of Technology in Materials Engineering degree program. My doctoral research was in experimental condensed matter physics. I have conducted original research on the optoelectronics characterization of cadmium sulfide nanostructures for making an ultrafast biosensor. While working on this project I learned all the major techniques involved in fabrication, optical and electrical characterizations. I have also done extensive reliability testing of gallium nitride based high electron mobility transistors during my postdoctoral project at the Ohio State University. Currently, at the University of California, Merced, I am working on a project to investigate the spin-mechanical interactions of the quantum mechanical systems used in gravity gradiometer applications. In this project, I'm exploring the potential of quantum-controlled sensitivity of quantum dots optical transitions to detect and enhance the sensing of gravitationally induced motion via spin-phonon coupling.

My multidisciplinary research experience facilitates setting up experimental labs where students can get involved in research to explore physics, and to learn proper research techniques and the fundamental concepts of physics. This gives students an advantage because of the wealth of interesting and educational projects they can explore with the knowledge of various experimental techniques.

Attached to this letter are my Curriculum Vitae and my Teaching Statement. I would appreciate an opportunity to discuss the details of the position and how my training, experience and enthusiasm can contribute to your students and faculty. I am available for an interview at your

convenience and can be reached by phone at 513-504-7674 or by email at parveen.kumar.iitk@gmail.com.

Thank you for your time and for considering me as the new assistant professor of physics. I look forward to hearing from you soon.

Parveen Kumar, Ph.D.

Post-Doctoral Scholar

University of California Merced