भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद

(भारत सरकार, अंतरिक्ष विभाग), नवरंगपुरा, अहमदाबाद 380 009

Physical Research Laboratory, Ahmedabad

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PRL Junior Research Fellowships (JRFs) – 2023

Applications for Junior Research Fellowships (JRFs) at Physical Research Laboratory (PRL) are invited from highly motivated and dynamic candidates to pursue research in any of the following science domains:

1. **Astronomy and Astrophysics:** Solar system's minor bodies like Comets and Asteroids in the optical wavelengths (both imaging-polarimetry and low-resolution spectroscopy), exoplanets around stars, multiwavelength (from radio wavelengths to optical wavelengths) research on stellar astrophysics including M dwarfs, symbiotic stars, morphological studies of star formation regions both high mass and low mass stars, optical and near-IR studies of transient events like novae, supernovae and GRBs, optical and near-IR studies of star clusters, extragalactic astronomy, studies of Radio galaxies using GMRT, and other globally available radio telescopes, Optical and near-IR instrumentation for PRL 2.5m telescope, Space-based X-ray astronomy instrumentation for future X-ray missions, Space-based X-ray observations of black holes, neutron stars and white dwarfs in binary systems, Active Galactic Nuclei (AGNs) and X-ray polarizations, Numerical simulation of the solar atmosphere and heliosphere.
2. **Atomic, Molecular, and Optical Physics:** *Experiment:* Quantum entanglement, quantum communication, quantum cryptography, quantum imaging, quantum sensing, nonlinear optics, quantum materials, quantum emitters, plasmonics, cavity QED, integrated photonic quantum computing, structured beams, generation and detection of THz radiations, astrochemical studies, shock processing of materials, reactions induced in astrochemical ices by projectiles, radiations and shockwaves, ultrafast reactions studies, femtosecond and attosecond processes, fragmentation dynamics of molecules, Photons and auger electron studies, XUV generations, Laser-Induced Breakdown Spectroscopy (LIBS), crystal defect dynamics studies, luminescence dosimetry, luminescence dating, Earth surface processes studies. *Theory:* Atomic many-body methods to study atomic clocks, parity and CP symmetry violations, isotope shifts, polarizabilities, etc.; machine learning, parallel programming.
3. **Geosciences:** Nitrogen and Carbon Cycling in Marine And Terrestrial Environments, Isotopic Fingerprinting of Waters of India, Paleoclimate Studies using Marine and Terrestrial Proxies, Marine Geochemistry, Chemical Weathering and Climate, Paleo-monsoon and Desertification on various time scales, Spatial and Temporal evolution of various Landforms of India, Evolution of Proterozoic Sedimentary Basins of India, Subduction Zone Volcanism, Catastrophic/extreme events, Mass Extinctions, and Earth Surface Processes, Ambient Aerosol Chemistry over Land and Oceans.
4. **Planetary Sciences and Space Exploration:** Studies of surfaces, atmospheres, and ionospheres of planets; theoretical modelling and observational studies of physical processes of Mars, Venus, Moon, and asteroids; origin and evolution of the solar system objects through laboratory analysis of extraterrestrial material (meteorites and sample returned missions); analysis of data from Indian missions Chandrayaan-1, -2, -3, Mars Orbiter Mission and Aditya-L1; scientific instrumentation for future planetary missions to Moon, Venus, and Mars; and Studies of planetary geology through the data obtained from space missions.
5. **Solar Astrophysics:** Physics of solar oscillations; structure and evolution of sunspots; magnetohydrodynamic processes in the solar atmosphere, coronal heating, solar eruptions; and space weather predictions, design and development of sophisticated instruments for solar observations and participation in upcoming national projects, like the Aditya-L1 space mission and National Large Solar Telescope (NLST).
6. **Space and Atmospheric Sciences:** Physics of the sun–earth interactions; space weather and its effect on society at large; atmospheric wave dynamics and coupling processes; aerosols and their impact on Earth's radiation budget; studies of trace gases, volatile organic compounds and their effects on the atmosphere; cloud dynamics; and global warming/climate change. Opportunities also exist for participation in upcoming Indian space missions like Aditya-L1, dual-aeronomy satellite mission DISHA, and missions to Venus and Mars.
7. **Theoretical Physics:** Condensed matter Physics-including quantum condensed matter physics, topological materials, unconventional superconductivity, strongly correlated electronic system, itinerant magnetism; Particle Physics – including neutrino physics, collider physics, dark matter phenomenology, CP violation, baryogenesis, heavy flavor physics, effective field theories, strong interaction physics, precision calculations in strong and electro-weak interaction physics, studies of extended gauge, global and space-time symmetries; Cosmology and Astro-particle Physics; Artificial intelligence and machine learning techniques in fundamental physics.

Candidates from disciplines of any branch of Physics, Engineering Physics, Photonics, Space Physics, Atmospheric Science, Environmental Science, Meteorology, Geology, Geophysics, and Remote Sensing are eligible to apply. Candidates must have Bachelor's and Master's degrees in Science or Engineering with at least a first-class (60%) or equivalent grades at both Bachelor's and Master's levels and must have qualified in any of the national examination(s) conducted by CSIR-UGC-NET JRF/AP [June 2022] in Physical Sciences/Chemical Sciences/Earth, Atmospheric, Ocean, and Planetary Sciences/GATE [2021/2022/2023] in Physics/Geology and Geophysics/Atmospheric and Oceanic Sciences/Chemistry, JEST 2023 in Physics, UGC-NET JRF/AP [December 2021 and June 2022 (merged cycles)/December 2022] in Environmental Sciences (applicable for candidates applying in Geosciences, Planetary Sciences and space exploration. Physics at the UG and PG levels is mandatory for candidates applying in Planetary Sciences and space exploration) with a valid score/All India Rank. A Candidate must be an Indian citizen and should have studied at recognized Universities/Institutes in India. The upper age limit is **28 years as on 01 July 2023**.

More details on research topics and the online application portal can be accessed at **https://www.prl.res.in/prl-eng/phd**. Apply online from **28 February 2023 to 17 April 2023 (14.00 hrs).** Interviews for the candidates screened will be held offline on 11, 12 May and 22, 23 June 2023. It is the candidate's sole responsibility to ensure the fulfilment of the eligibility criteria as notified. The candidate should fully comply with the procedural requirements and time limits stipulated for submission of the online application. Any deviations from the above would result in the cancellation of candidature, and any representation on such matters will not be entertained.

DEAN, PRL