



## PRL Junior Research Fellowship Programme 2025

Advt. No. PRL/JRF/01-2025

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

**Astronomy and Astrophysics:** Solar system's minor bodies like Comets and Asteroids in the optical wavelengths (imaging-polarimetry and low-resolution spectroscopy), exoplanets around stars, multiwavelength (from radio to optical wavelengths) research on stellar astrophysics, including M dwarfs, symbiotic stars, morphological studies of star formation regions of both high and low mass stars, optical and near-IR studies of transient events, like novae, supernovae and gamma-ray bursts, optical and near-IR studies of star clusters, extragalactic astronomy, studies of radio galaxies using GMRT, and other radio telescopes around the globe, optical and near-IR instrumentation for PRL's 2.5m telescope, instrumentation for space-based X-ray astronomy for future X-ray missions, space-based X-ray observations of black holes, neutron stars and white dwarfs in binary systems, active galactic nuclei and X-ray polarizations, numerical simulation of the solar atmosphere and heliosphere.

**Atomic, Molecular and Optical Physics:** Experiment: Quantum entanglement, quantum communication, quantum cryptography, quantum imaging, quantum sensing, nonlinear optics, quantum materials, quantum emitters, plasmonics, cavity quantum electrodynamics, 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, 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, machine learning, and parallel programming.

**Geosciences:** Terrestrial and Marine Carbon and Nutrient Cycling, Isotope Hydrology, Paleoclimate and Paleoceanography, Geoarchaeology, Marine Geochemistry, Isotope Geochemistry and Cosmochemistry, Chemical Weathering and Climate, Evolution of Glacial/Fluvial/Coastal Quaternary Environments, Earth Surface Processes, Evolution of Proterozoic Sedimentary Basins of India, Subduction Zone Volcanism, Catastrophic/extreme events, Ambient Aerosol Chemistry over Land and Oceans, Environmental Microplastics.

**Planetary Sciences & 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.

**Space & Atmospheric Sciences:** Physics of the Sun-earth interactions; space weather and its effects; ionospheric processes; 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; study of atmospheric clouds and boundary layer dynamics using Lidar; aspects of global warming and climate change. Opportunities exist for working in solar and heliospheric physics using data from the ongoing Aditya-L1 mission of India. Terrestrial and planetary space weather-related studies are also envisaged considering the upcoming Indian space missions like dual-astronomy satellite mission (DISHA) and missions to Venus and Mars.

**Solar Astrophysics:** Physics of solar oscillations; structure and evolution of sunspots; magnetohydrodynamic processes in the solar atmosphere, coronal and chromospheric heating, solar eruptions; and space weather predictions, design, and development of sophisticated instruments for solar observations and participation in national projects like the Aditya-L1 space mission, and upcoming National Large Solar Telescope (NLST).

**Theoretical Physics:** Theoretical condensed matter Physics - including quantum condensed matter physics, low-dimensional quantum systems, topological materials, unconventional superconductivity, strongly correlated electronic systems, itinerant magnetism; Theoretical 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, Astroparticle Physics; Artificial intelligence with deep machine learning for feature extraction and explainability in fundamental research.

Candidates from disciplines of any branch of Physics, Engineering Physics, Photonics, Space Physics, Atmospheric Science, Chemistry, Environmental Science, Meteorology, Geology, Geophysics, Earth Science, Oceanography 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. Applicants must have qualified in any one of the following exams:

- CSIR-UGC-NET JRF/AP [Not before December 2023] in Physical Sciences / Chemical Sciences / Earth, Atmospheric, Ocean, and Planetary Sciences,
- GATE [Not before 2023] in Physics / Geology and Geophysics / Atmospheric and Oceanic Sciences / Chemistry,
- JEST 2025 in Physics,
- UGC-NET JRF/AP [Not before December 2023] in Environmental Sciences (applicable for candidates applying in Geosciences, Space & Atmospheric Sciences, Planetary Sciences & space exploration. UG and PG level Physics is mandatory for candidates applying in Space & Atmospheric Sciences, Planetary Sciences & space exploration) with a valid score/All India Rank.

Candidates with External Fellowships such as DST-INSPIRE and CSIR-JRF can apply through this advertisement.

The candidate must be an Indian citizen and should have studied at recognized Universities/Institutes in India.

**Incentive for exceptionally meritorious PRL JRFs:** PRL has instituted a Platinum Jubilee Research Fellowship (ATAL) for PRL JRFs aspirants with proven academic credentials pursuing high-quality fundamental research at PRL. The fellowship will be for 03 years (from 3rd to 5th year tenure). There is a provision of a maximum of two ATAL fellowships, and the amount will be Rs. 40,000 per month in kind, in addition to the regular monthly Research Fellowship.

**Age limit:** The upper age limit is 28 years as on 01 July 2025.

**Fellowship:** Junior Research Fellows (JRF): Rs. 37,000/- pm & Senior Research Fellows (SRF): Rs. 42,000/- pm. On completion of 2 years and subject to successful academic review, JRFs may be awarded SRF. The performance of the Research Fellows shall be reviewed yearly for the continuation of the fellowship.

More details and the online application portal can be accessed at <https://www.prl.res.in/prl-eng/phd>. **Apply online from 24.03.2025 to 21.04.2025.** Interviews for the screened in candidates will be held offline on **29-30 May and 02-03-04 June 2025.** The candidate's sole responsibility is 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 cancel candidature, and any representation on such matters will not be entertained.

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