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PRESS-RELEASE

IIT (ISM) hosts lecture by eminent geoscientist Dr O.P. Pandey on India's unusually hot and unstable lithosphere

As part of its *Centenary Lecture Series*, IIT (ISM) Dhanbad organised an insightful lecture by internationally acclaimed geoscientist **Dr. Om Prakash Pandey, FNASc**, on *"Enigmatic Indian Crust and Underlying Mantle Lithosphere: A New Understanding Provided by Recent Geophysical Studies and Deep Scientific Drilling Results."* The lecture was held at 4:00 pm in the Department of Applied Geophysics.

The session opened with **Prof. Saumen Maiti, Associate Professor and Head of the Department**, who welcomed the gathering and introduced the distinguished speaker by reading out his bio-note. The event was attended by **Prof. Saurabh Datta Gupta, Associate Professor, Department of Applied Geophysics, and Professor-in-Charge (International Relations & Alumni Affairs)**, along with **Prof. Mohit Agarwal, Prof. Upendra Kumar Singh**, faculty members, students, and research scholars.

Dr. Pandey presented a compelling overview of the Neoproterozoic crust and mantle lithosphere of the Indian shield, describing it as highly complex, super-mobile, and unusually unstable. Despite being among the world's oldest continental blocks, he noted, the Indian shield exhibits extraordinary heterogeneity shaped by tectonic reworking, metasomatism, and deep-seated seismic processes. Using multiparametric geophysical and geochemical data—including rare insights from the 617-m-deep KLR-1 scientific borehole drilled in the 1993 Killari earthquake region—he explained that the 2.57-billion-year-old crystalline basement comprises predominantly amphibolite-to granulite-facies mid-crustal rocks intruded by TTG suites.

These rocks, emplaced at depths of 15–20 km under temperatures of 540–860°C, are high-density (2.82 g/cm³), halogen-rich, and significantly deformed, displaying strong evidence of metasomatism caused by mantle-derived hydrothermal fluids. Dr. Pandey highlighted that such metasomatism results in up to a 15% reduction in seismic P-wave velocity, weakening the crustal framework and influencing earthquake nucleation.

One of the most striking findings discussed was the unusually shallow **lithosphere–asthenosphere boundary (LAB)** beneath the Indian shield—located at nearly **100 km**, compared to the global average of 250–350 km for similar cratonic terrains. This suggests the removal of more than 150 km of mantle lithosphere, making the Indian lithosphere exceptionally hot, thin, and seismically unstable. He emphasized that this anomaly warrants a broader reassessment of LAB depths in ancient terrains worldwide.

Dr. Pandey, a distinguished alumnus renowned for his work on heat flow, lithospheric evolution, and geodynamics, enthralled the audience with his clarity and depth. Faculty and scholars described the centenary lecture as stimulating, enriching, and a strong reflection of IIT (ISM)'s commitment to advancing high-quality research and scientific discourse.

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