# IIT Bombay Develops India’s First Quantum Diamond Microscope to Aid Neuroscience & Materials Research

**Published On: 13-11-2025**

In November 2025, the researchers from the Photonics and Quantum Engineering**(P-Quest) Lab**at Indian Institute of Technology**(IIT)-Bombay,**Mumbai (Maharashtra) developed**India’s first Indigenous Quantum Diamond Microscope**(QDM), marking a milestone in quantum sensing, which earned India its first patent in this domain.

- The development, led by Professor Kasturi Saha, was announced during the Emerging Science Technology and Innovation Conclave (ESTIC 2025) held in New Delhi, Delhi.
- It was developed under the National Quantum Mission**(NQM)**of the Department of Science and Technology (DST), Ministry of Science & Technology(MoS&T).

**AboutIndia’s first Indigenous Quantum Diamond Microscope (QDM):**

**Dignitaries:**Union Minister of State (MoS) Independent Charge (IC)**DrJitendra Singh,**MoS&T, Professor Ajay K. Sood, Principal Scientific Adviser(PSA), and Professor Abhay Karandikar, Secretary, DST, were also present at theevent.

**QDM:**It is a quantum sensor-based imaging device that uses Nitrogen Vacancy**(NV)centres**inside a diamond crystal to detect and visualize magnetic fields similar to how an optical microscope images light.

**NVCentres:**The NV centres are tiny atomic defects in diamond where a nitrogen atom sits next to a missing carbon atom. These defects stay stable even at room temperature and are extremely sensitive to changes in magnetic, electric, and thermal fields.

- Their light emission changes with magnetic signals, which can be measured using Optically Detected Magnetic Resonance (ODMR) method.
- By creating a thin diamond layer with many NV centres, the QDM can capture wide-area images of magnetic activity similar to how an optical microscope captures light images.

**3?D Nanoscale Magnetic Imaging :**The QDM allows wide?field, three?dimensional magnetic?field imaging at the nanoscale. It can visualise magnetic fields in 3?D, map hidden current paths in multilayer chips, assess materials and devices non?destructively, and even support applications in neuroscience.