

## Activities

**SUPERCONDUCTIVITY 2025: This piece of work coming under SDG-7 (energy efficient electrical transmission with zero loss) is identified by SDG cell as an activity that would bring global recognition to the Institution.** Superconductivity is an amazing state of matter in which electrical resistivity vanishes, but only below a certain temperature known as critical temperature ( $T_c$ ) which was as low as liquid He temperature, 4K in 1912 (N Physics 1913) and rose to liquid Nitrogen temperature, LNT, 77K in 1986 (N Physics 1987). The highest  $T_c$  as on date at ambient pressures is  $\sim 133$ K in Hg-Ba-Ca-Cu-O. Practical implications of superconductivity are really astounding, starting from bullet trains to ENERGY EFFICIENT ELECTRICAL CABLES WITH ZERO TRANSMISSION LOSS, to quantum computers.

Superconductivity at still higher temperatures is very challenging but has attracted, since 2015, the attention of experimental scientists from USA, Korea, China and the Indian Institute of Science, Bangalore. **The theoretical feasibility of Superconductivity at higher temperatures and ambient pressures, in some thin films made using electro-chemical methods is already completed by MITS faculty in association with the Institute of Mathematical Sciences, Chennai (2024). The results are ready for publication\* in peer reviewed SCI journals, with first authored MITS affiliation, as a step towards SDG-7.** A joint venture with IIT Madras for further activities is ongoing.

**\*Current Trends in Room Temperature Superconductivity: A Perspective**

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