

## **Seminar**

### **The Reverse Rutherford Era of Dark Matter**

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Dark matter is an invisible, ubiquitous substance that makes up four-fifths of all matter, yet its identity has remained a mystery despite heroic efforts to pinpoint it. One promising approach to detect it is to observe unusual effects of its scattering on well-understood stationary targets, essentially the Rutherford scattering experiment in reverse. In this talk I will outline two experiments that I have proposed. (1) Through scattering, dark matter could set ancient neutron stars on fire, which may be observed by the recently launched James Webb Space Telescope, the imminent Thirty Meter Telescope, and several other astronomical missions. Observing this "kinetic heating" of neutron stars would be the most extensive method to date for detecting dark matter. (2) Dedicated metre-sized detectors on Earth looking for dark matter particles have caught none so far perhaps because these particles are at least kilometres apart. I will discuss new strategies to catch them, and a search I performed in collaboration with the DEAP-3600 experiment, placing the first laboratory limits on particle dark matter at the Planck scale ( $\sim 10^{19}$  GeV).

***Thursday, Dec 1<sup>st</sup> 2022***

***4:00 PM (Tea/Coffee at 3:45 PM)***

***Auditorium, TIFR-H***