ICTS Astrophysics & Relativity Seminar

Title : Bondi-Hoyle-Lyttleton accretion onto ultra dense dark matter halos and direct collapse black holes

Speaker : Kandaswamy Subramanian (IUCAA, Pune and Ashoka University, Haryana)

Date : Thursday, 14 May 2026

Time : 3:30 PM (IST)

Abstract : The direct collapse of gas in dark matter halos to form black holes requires several ideal conditions. The gas must be hot enough, yet gravitationally unstable to rapid collapse. Further cooling and fragmentation during collapse be suppresed. Angular momentum in the accreted gas be minimal and any remaining, be efficiently lost due to viscous or gravitational torques. We suggest that all these conditions arise naturally when primordial gas is accreted into a massive enough dark matter halo, which has formed around recombination, from rare curvatuture perturbations. Our scenario leads to the formation of a supermassive star and/or black hole with intermediate mass of about a 1000 solar mass at redshifts of a few hundred. Such black holes can have a large-enough abundance to seed the first super massive black holes and help explain the abundance of active galaxies detected now at increasingly larger redshifts by the James Webb Space Telescope.

Reference:
K. Subramanian, B. Phookun, Physical Review D 113 (8), 083523 (2026)

Venue : Feynman Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/94174252775?pwd=hAd8YhXw6KZoQQHS0o6XbnJHXyxdYY.1
Meeting ID: 941 7425 2775
Passcode: 141415