S. N. Bose National Centre for Basic Sciences

Bose Colloquium

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SPEAKER

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Title

Dwindle, Dwindle Little Stars – Hunting for Substellar Objects Young and Old Rich and Poor

Abstract

With mass too low to sustain core hydrogen fusion, substellar objects continue to cool and fade after birth. Those heavier than 13 jupiter masses, called brown dwarfs, manage to ignite deuterium or lithium, thereby maintaining hydrostatic equilibrium for a short period of time. Those less massive than this do not undertake any nuclear reaction whatsoever in their lives and evolve like planets. So far some 2,000 brown dwarfs and planetary-mass objects are known, almost all in the field, i.e., they are already aged. Characterization of the youngest substellar objects by spectroscopy is hampered by their faintness and often confusion with field contaminations. We describe our international collaboration to select substellar candidates in nearby star-forming regions of a couple Myr old, when brown dwarfs are being formed or in their infancy. Our sample of substellar populations in star clusters, with known ages and distances, will provide stringent constraints on theoretical modeling of ultracool atmospheres, and of chromospheric activity. We also present how these least-massive members as the most vulnerable in stellar dynamics to get ejected, leading to eventual disintegration of star clusters.