INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032, India

Seminar Notice

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School of Physical Sciences

Title:	**How "cold" are superthin disks? A Markov Chain Monte Carlo (MCMC) study**
Speaker:	**Arunima Banerjee, Department of Physics, IISER, Tirupati**
Date:	**July 17, 2019 (Wednesday)**
Time:	**4:00 p.m.**
Venue:	**Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS**
Abstract:	Superthin galaxies are class of low surface brightness galaxies with strikingly high values of planar-to-vertical axes ratio (b/a > 10--20) with little or no bulge component possibly indicating the presence of an ultra-cold stellar disc, the origin and evolution of which is not well understood. Using the 2-component model of gravitationally-coupled stars and gas in vertical hydrostatic equilibrium in the external force field of the dark matter halo, we determine the radial profile of vertical velocity dispersion for both stellar and gas components for three superthin galaxies: UGC 7321, IC5249 and FGC1540 using Markov Chain Monte Carlo (MCMC) method, for which the mass models using B-band, 3.6 micron photometry and HI 21 cm radio-synthesis observations were already available in literature. We find that the central value of vertical velocity dispersion for stellar component B-band varies between 8.4 -10. 9 km/s and falls off with an exponential scale length of 1.9 to 3.5 R_d where R_d is the exponential stellar disc scale length. In the 3.6 micron band, the same varies between 5.6 and 9.7 km/s with a scale length of 5.5 - 11.5 R_d. Interestingly, our best-fitting values for the central vertical velocity dispersion of stars in superthin galaxies is a factor of 3-4 smaller than the directly measured values of the same in ordinary disc galaxies like the Milky Way and the Andromeda. Further our model results are consistent with those we derive using AGAMA (Action-based Galaxy Modelling Architecture) which was primarily developed to model GAIA data. Our calculated values of 2-component disc dynamical stability parameter (Romeo & Wiegert 2011) Q_{RW} lies between 1.7 - 3.2 thus confirming the dynamic stability of our model.

All are cordially invited to attend the seminar