

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:	The dipolar spin glass transition in three dimensions
Speaker:	Tushar Kanti Bose, School of Physical Sciences, IACS, Kolkata
Date:	July 11, 2019 (Thursday)
Time:	3:00 p.m.
Venue:	Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS
Abstract:	Dilute dipolar Ising magnets remain a notoriously hard problem to tackle both analytically and numerically because of long-ranged interactions between spins as well as rare region effects. We study a new type of anisotropic dilute dipolar Ising system in three dimensions [Phys. Rev. Lett. 114, 247207 (2015)] that arises as an effective description of randomly diluted classical spin ice, a prototypical spin liquid in the disorder-free limit, with a small fraction x of non-magnetic impurities. Metropolis algorithm within a parallel thermal tempering scheme fails to achieve equilibration for this problem already for small system sizes. Motivated by previous work [Phys. Rev. X 4, 041016 (2014)] on uniaxial random dipoles, we present an improved cluster Monte Carlo algorithm that is tailor-made for removing the equilibration bottlenecks created by clusters of effectively frozen spins. By performing large-scale simulations down to $x=1/128$ and using finite size scaling, we show the existence of a finite-temperature spin glass transition and give strong evidence that the universality of the critical point is independent of x when it is small. In this $x \ll 1$ limit, we also provide a first estimate of both the thermal exponent, $\nu=1.27(8)$, and the anomalous exponent, $\eta=0.228(35)$. Reference: Bose, Moessner, and Sen, arXiv: 1906.10342

All are cordially invited to attend the seminar