S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Physics of Complex Systems

30th October, 2025 **4.00 PM** **ONLINE / FERMION**

SPEAKER

Dr. Debleena Thacker, Associate professor,
Department of Mathematical Sciences
Durham University, UK

TITLE OF THE TALK

Border aggregation models and its connections to other models in statistical physics

ABSTRACT

In this talk we will consider a class of models studied in statistical physics, where we build random aggregates or random clusters on graphs by releasing independent and identically distributed random walks.
Start with a graph with a subset of vertices called the border. A particle released from the origin performs a random walk on the graph until it comes to the immediate neighbourhood of the border, at which point it joins this subset thus updating the border by adding this new location. Then a new particle is released from the origin and the process repeats until the origin becomes a part of the border itself. The cluster is a random collection of sets, where initially the cluster is just the border and at every time it is the new updated border. We are interested in the total number of particles to be released by this final moment. This model will be referred to as the Border Aggregation (BA) model and in this talk we will be interested in graphs that are either a finite depth regular trees or a sphere of finite radius in the d-dimensional integer lattice. Interestingly, the BA model has connections (couplings) with other popular models in statistical physics such as the classical Diffusion Limited aggregation (DLA) and the Internal DLA (IDLA). We will discuss these connections and prove interesting results for both the BA and the IDLA models.

This talk is based on joint works with: Stanislav Volkov, Svante Janson, Andrew Wade and Conrado da Costa.

HOST FACULTY

Prof. Punyabrata Pradhan, Professor
DEPT. OF PHYSICS OF COMPLEX SYSTEMS
****