



Physical Research Laboratory, Ahmedabad

COLLOQUIUM - 12-29

Speaker: Prof. Deepak Dhar

Department of Theoretical Physics, Tata Institute of Fundamental Research (TIFR), Mumbai.

Title: Modelling proportionate growth

Abstract

It is fascinating to see baby animals grow into adults. Understanding the development of different organs from a single egg cell has been the central problem in developmental biology for over a hundred years. However, there is a considerably simpler problem of understanding how a small baby animal grows to a much larger size. In the case of humans, the body weight increases by a factor of 30 or so. In the case of elephants, this factor is about 100. As the baby grows, different parts of the body grow at same rate. This is called proportionate growth. The recent work on a simple sandpile model where this feature comes out quite naturally from local rules, without fine tuning any parameter will be discussed. The patterns produced are composed of large distinguishable structures with sharp boundaries, all of which grow at the same rate, keeping their overall shapes unchanged.



FIGURE: Proportionate growth shown in patterns formed in the growing sandpile by adding N particles at a single site on a background with all sites with height 2, for $N = 4 \times 10^4$, 2×10^5 , and 4×10^5 . Color code 0, 1, 2, 3 = R, B, G, Y

The Speaker

Prof. Deepak Dhar, Distinguished Professor, TIFR, did his B.Sc. from the University of Allahabad (1970), M.Sc. from the IIT, Kanpur (1972). He obtained his Ph.D. from the California Institute of Technology, Pasadena, USA (1978). Prof. Dhar joined TIFR in 1978. He was a Visiting Scientist (1984-85) at the University of Paris. His research has been in the area of Statistical Physics, especially nonequilibrium systems; self organized criticality, structure of linear and branched polymers, fractals, the glassy state. Prof. Dhar's most significant contribution has been his studies of the Abelian sandpile model of self-organized criticality. Prof. Dhar is a fellow of the Indian National Science Academy, New Delhi, National Acad. of Sciences, Allahabad, Indian Acad. of Sciences, Bangalore and Third World Academy of Sciences, Trieste. He is a recipient of INSA medal for young scientist, S. S. Bhatnagar award, JR Schrieffer Prize and S. N. Bose Medal of INSA. Prof. Dhar is a Rothschild Professor, Isaac Newton Institute, UK (since May 2006) and the J. C. Bose Fellow (2007-2017).

Wednesday: 10 October, 2012, 16:00 hrs.

K.R. Ramanathan Auditorium, PRL

Tea at 15:30 hrs.

ALL ARE WELCOME



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A YEAR OF NEW SCIENCE, NEW DISCOVERIES and DEEPER SOCIETAL COMMITMENT**