JOHNS HOPKINS
Center for Environmental & Applied Fluid Mechanics

Weekly CEAFM Seminar: Spring 2012

Friday, May 4, 2012
11:00 a.m. – 12:00 p.m.
Gilman 50 (Marjorie M. Fisher Hall)

"TURBULENT DYNAMOS IN ASTROPHYSICS: PROBLEMS AND PROSPECTS"

Presented by

Dr. Kandaswamy Subramanian

(IUCAA: Pune, India)

Abstract: Magnetic fields and turbulence are ubiquitous in the universe. Here we review the turbulent dynamo generation of astrophysical magnetic fields focusing on galactic and galaxy cluster magnetism. Turbulence generically leads to fluctuation or small-scale dynamos, which are crucial to understand magnetic fields in clusters and young galaxies. The degree of coherence of the generated fields is a major concern. Some form of mirror-asymmetry is required to generate fields on scales larger than turbulent eddy scales, as inferred in present day disk galaxies. However such mean-field dynamos need to operate in the presence of strongly growing fluctuations and also shed small scale helicity to avoid quenching. The present status of these ideas is elucidated.

Bio: Dr. Kandaswamy Subramanian is a Professor (Scientist-H) and Dean, Visitor Academic Programmes at the Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune. Having received his PhD in 1985 from the University of Bombay working at the Tata Institute of Fundamental Research, Bombay, he was then a post-doctoral fellow at the Institute of Astronomy, Cambridge and the Astronomy Centre, University of Sussex, UK. He is a Fellow of the Indian Academy of Sciences and also received the B. M. Birla Prize for Physics. His main research interests are on the origin of cosmic magnetic fields, cosmology and structure formation in the universe.