

GIAN COURSE

Origin and evolution of perturbations during inflation and reheating

Inflation - which refers to a brief period of accelerated expansion of the universe during the early stages of the radiation dominated epoch - is currently considered the most promising paradigm to describe the origin of perturbations in the early universe. The inflationary epoch magnifies the quantum fluctuations that are invariably present at the beginning of the epoch and converts them into classical perturbations, which leave their imprints as anisotropies in the Cosmic Microwave Background (CMB). These anisotropies in turn act as seeds for the formation of the large scale structures that we observe at the present time as galaxies and clusters of galaxies. The anisotropies in the CMB have been measured with increasingly high precision by various CMB missions such as the Wilkinson Microwave Anisotropy Probe and Planck. These observations have helped us arrive at rather strong constraints not only on models of inflation but also on the epoch of reheating, which is expected to immediately follow inflation.

The course will begin with an introduction to the paradigms of inflation and reheating. It will then focus on the origin and evolution of the perturbations during these epochs and finally conclude by outlining as to how one arrives at constraints on the models of the early universe from the cosmological observations.

Dates of the course	November 25-30, 2016
Host institute	Indian Institute of Technology Madras, Chennai
Number of credits	1 credit (if you are a student in an IIT, NIT or CFTI, you can carry the credits back)
Maximum number of participants	30
You should attend if...	The main objective of the course will be to help students appreciate the implications of the cosmological observations on the physics of the early universe. This, in turn, requires an understanding of the evolution of the background as well as the perturbations during these early epochs. Students who are interested in the areas of gravitation, high energy physics and cosmology stand to benefit from the course.
Course registration fees	The participation fees (which also covers the course material) for the course is as follows: Student Participants: Rs. 1000 Faculty Participants: Rs. 2000 Government Research Organization Participants: Rs. 2000 GIAN portal registration: Rs. 500 (for first time GIAN users, existing users need not pay this fee) Mode of payment: Demand draft in favor of "Registrar, IIT Madras" payable at Chennai. The demand draft can be handed over to the Course Coordinator at the start of the course. (Please note that no other mode of payment will be accepted.) Participants will be selected after their application for the course on the GIAN portal. Registration is not equivalent to selection for the course.
Accommodation	Participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel

Course Faculty



- **Prof. Jérôme Martin** is the Directeur de Recherche (Director of Research) at the Centre National de la Recherche Scientifique (CNRS, National Agency for Research) and is affiliated to GreCO, Institut d'Astrophysique de Paris (IAP), Paris, France. His research interests include Cosmology, Quantum Field Theory, High Energy Physics, Astrophysics and Quantum Mechanics. He is well known for his significant contributions in the areas of inflation and reheating.



- **Prof. L. Sriramkumar** is a Professor in the Department of Physics at the Indian Institute of Technology Madras, Chennai, India. His research interests include Semi-classical Gravity and Cosmology. His current research work is focused on comparing alternative mechanisms for the generation of perturbations in the early universe.

Course Coordinator

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