

ICTS Colloquium

- Title** : A tale of two dynamos: turbulent large-scale and small-scale dynamos
- Speaker** : Pallavi Bhat, University of Leeds
- Date** : Thursday, January 16, 2020
- Time** : 2:00 PM
- Venue** : Emmy Noether Seminar room, ICTS Campus, Bangalore
- Abstract** : Coherent magnetic fields are ubiquitous in the universe as in the Sun, stars, galaxies and galaxy clusters. The theory of turbulent dynamos is the leading paradigm to understand the origin of these magnetic fields. A particularly generic process in turbulent astrophysical systems is the small scale dynamo (SSD). I will outline the progress made in the theoretical understanding of the coherence properties of the SSD, via both, analytical models and high resolution direct numerical simulations. The large-scale dynamo (LSD), on the other hand, requires special conditions in turbulence (like kinetic helicity) to operate and does so on time scales longer than that of the SSD. The two dynamos are intricately connected and can operate in the same system. Previous research suggests that LSD generated mean fields suffer due to the SSD generated fluctuating fields in large magnetic Reynolds number systems. I will show some of our recent findings that indicate that even after the saturation of the SSD, the LSD continues to operate, growing fields exponentially. These findings alleviate the concern that large-scale fields are overwhelmed by rapidly growing small-scale fields in such systems.