

ICTS Skype Seminar

- Title** : Statistical analysis of complex systems with dynamical constraints: a random matrix approach
- Speaker:** Suchetana Sadhukhan, Indian Institute of Technology Kharagpur, West Bengal
- Date** : Thursday, August 3, 2017
- Time** : 3:00 PM
- Venue** : Amal Raychaudhuri Meeting Room, ICTS Campus, Bangalore
- Abstract** : The focus of my current research is on exploring statistical properties of complex systems subjected to conditions which manifests through specific constraints on the column/row sum of the matrix elements of its Hermitian operators. This gains the rapid attention because of its appearance in widely different areas e.g. bosonic Hamiltonians such as phonons, and spin waves in Heisenberg and XY ferromagnet, antiferromagnets, and spin glasses, Goldstone modes, Euclidean random matrices, random reactance networks, Internet related Google Matrix, financial markets and pattern games etc. Presence of the additional constraints besides real symmetric nature leads to new correlations among their eigenfunctions, hinders a complete delocalization of dynamics and affects their eigenvalues too [1, 2]. This system turns out to be statistically analogous to a critical Brownian ensembles, intermediate between Poisson to Gaussian Orthogonal ensemble(GOE) [1, 2]. Later, I have studied criticality in Brownian ensembles during Poisson to Gaussian Orthogonal ensemble(GOE) [3].

References

- [1] Shukla, P. and Sadhukhan, S. (2015), Random matrix ensembles with column/row constraints: I. J. Phys. A: Math. Theor. 48 415002.
- [2] Sadhukhan, S. and Shukla, P. (2015), Random matrix ensembles with column/row constraints: II. J. Phys. A: Math. Theor. 48 415003.
- [3] Sadhukhan, S. and Shukla, P. (2017), Criticality in Brownian ensembles. Phys. Rev. E. 96 012109.