

## ICTS String Seminar

- Title** : Non-Supersymmetric Fixed Points and the BMB Phenomenon in  $d=3$  Gauged Sextic Scalar Models
- Speaker** : Shiroman Prakash (Dayalbagh Educational Institute, Uttar Pradesh)
- Date** : Wednesday, 17 June 2026
- Time** : 3:30 PM (IST)
- Abstract** : The swampland conjectures suggest that many seemingly realistic low-energy quantum field theories cannot be extended to UV-complete theories of quantum gravity, and that supersymmetry is essential for stable AdS-vacua. However, a landscape of non-supersymmetric lines of fixed points can be defined in  $d=3$  via Chern-Simons theory coupled to bifundamental matter, raising the question of whether these theories possess (meta)stable AdS duals. This talk explores the stability of the quantum effective potential (generalizing the Bardeen-Moshe-Bander (BMB) phenomena) and the existence of generalized Pisarski fixed points for a theory containing bifundamental  $O(M)\times O(N)$  scalars with a marginal sextic potential. Building on earlier work by Kapoor and SP (2023), we work in the large- $N$  vector model limit where  $N$  is very large and  $M$  is finite, which allows us to use large  $N$  vector model techniques to determine the stable region. We gauge the  $O(M)$  symmetry with a Chern-Simons gauge field and compute the exact  $1/N$  beta-function of the theory. We also compute the BMB stable region and determine the fixed points of the beta function as a function of the Chern-Simons 't Hooft coupling  $\lambda=M/k$ . We ask whether any of these fixed points exist in the BMB stable region (i.e. the region where the effective potential is stable). Preliminary results suggest that when  $M>2$ , no fixed points exist in the stable region when the Chern-Simons interaction is non-zero; a result that provides non-trivial support to the swampland conjectures.
- Venue** : Emmy Noether Seminar Room  
Zoom Link: <https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09>  
Meeting ID: 880 9276 6911  
Passcode: 232322