JOINT TUFTS/MIT COSMOLOGY SEMINAR

Optimal reconstruction of the Hellings and Downs correlation

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Pulsar timing arrays (PTAs) detect gravitational waves (GWs) via the correlations they create in the arrival times of pulses from different pulsars. The mean correlation, a function of the angle between the directions to pulsars, is called the Hellings and Downs (HD) curve. Observation of this pattern is key evidence that the timing residuals arise from GWs, so PTAs "reconstruct the HD curve" by estimating the inter-pulsar correlation using pulsar pairs separated by similar angles. I'll talk about how PTAs work, and about a recent paper (with Joe Romano, PRL 134, 031401, 22 Jan 2025) where we examine the reasons why the HD reconstruction differs from the mean, and estimate the variance. I'll also talk our (still in progress, arXiv:2412.14852) attempts to extend this to a harmonic space description.

Tuesday, February 4, 2025, 2:30 pm

Cosman Seminar Room

Center for Theoretical Physics

Building 6C, Room 6C-442