



Aurora invites you to: **ASTRO webinar**

The Shape of Space: Hunting for the Topology of the Universe

Abstract:

Measuring the topology of the Universe — its shape — would be a truly remarkable physics accomplishment as we would know the full extent of space and we would map the entire Cosmos. The search for cosmic topology has compelling motives beyond our curiosity about this fundamental property of the Universe. Discovery of non-trivial topology would have enormous implications for the theory of quantum gravity and would require significant rethinking of the earliest moments of cosmic history. Cosmic topology may also, perhaps uniquely, explain the observed anomalous large-angle features in the cosmic microwave background (CMB). Observational searches, using the CMB, have so far considered only a small subset of testable topologies, and current limits on the topology scale are much weaker than generally understood. For generic topologies, off-diagonal correlations between microwave background harmonic coefficients over a wide range of scales encode significant topological information. In Fourier space, probed in detail by future galaxy and 21cm surveys, these correlations are expected to hold true even if the topology scale substantially exceeds the diameter of the observable Universe. I describe an ambitious program to exhaustively search for cosmic topology in current and future cosmological data.

Tuesday

May 20th , 2025

11:00 AM

Gathering location:

Pierce Observing Room

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UCR PHYSICS & ASTRONOMY

Coffee and Cookies from 10:45