Chern-Simons Propagators:
New Tools for Parity-Violating Theories in AdS3

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Zoom link will be sent separately.

Abstract: The embedding formalism provides powerful tools for studying quantum field theories in AdS, but has been limited to parity-conserving theories. We extend this framework to parity-violating theories by introducing a `Chern-Simons operator' that systematically relates parity-odd and parity-even harmonic functions. This operator squares to the Laplacian in AdS3 and enables construction of simultaneous eigenfunctions, which we use to compute propagators in Chern-Simons theories. We verify consistency with expected boundary correlators. We also derive a split-representation which will be potentially useful for loop calculations. Our results provide new tools for perturbative calculations in parity-violating theories in AdS3 and pave the way for studying interesting physics including dualities, loop corrections, and exploring connections to two-dimensional conformal field theories.