Contribution ID: **220** Type: **Contributed Oral**

Emergent metric from wavelet-transformed quantum field theory

Monday 1 December 2025 14:30 (15 minutes)

We introduce a method of reverse holography by which a bulk metric is shown to arise from locally computable multiscale correlations of a boundary quantum field theory (QFT). The metric is obtained from the Petz-Rényi mutual information defined with input correlations computed from the continuous wavelet transform. We show for free massless fermionic and bosonic QFTs that the emerging metric is asymptotically anti-de Sitter space (AdS), and that the parameters fixing the geometry are tunable by changing the chosen wavelet basis. The method is applicable to a variety of boundary QFTs that need not be conformal field theories, such as theories with mass or temperature for which we compute the emergent geometries.

Author: VEDL, Simon (Macquarie University)

Co-authors: Mr GEORGE, Dan (Macquarie University); K. BRENNEN, Gavin (Macquarie University)

Presenter: VEDL, Simon (Macquarie University)

Session Classification: Theoretical Physics

Track Classification: Topical Groups: Theoretical Physics