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Chaos, Eigenstate Thermalization, and 3D Gravity

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In recent years, it has become clear that the path integral of semiclassical 3D gravity offers a “coarse-grained” description of its holographic 2D CFT. This relationship is particularly transparent when considering the statistical moments of operator product expansion (OPE) coefficients in the CFT. In this talk, I will explore the statistical properties of OPE coefficients through the perspective of quantum chaos. I will introduce an ensemble of OPE data defined as the minimal solution to crossing consistent with approximate unitary invariance. Notably, this ensemble is constructed without relying on any specific matrix or tensor model. The ensemble predicts new contributions to the sum over topologies in 3D gravity, which are precisely realised by novel topologies in the bulk.

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