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Universal corner contributions to Renyi entanglement entropies in 3+1 dimensions LAUREN HAYWARD SIERENS, University of Waterloo / Perimeter Institute for Theoretical Physics, PABLO BUENO, University of Leuven / University of Amsterdam, RAJIV SINGH, University of California, Davis, ROBERT MYERS, Perimeter Institute for Theoretical Physics, ROGER MELKO, University of Waterloo / Perimeter Institute for Theoretical Physics — A vast number of quantum systems in their ground states are known to yield entanglement entropies that scale according to a leading area law. There can be subleading corrections to this area law behaviour, and for critical systems such corrections can potentially contain universal numbers. We perform numerical calculations of Renyi entanglement entropies for massless free bosonic field theories on a lattice in 3+1 dimensions. We focus on the case where the entangled regions are separated by a boundary with a sharp corner and utilize techniques from the numerical linked cluster expansion to isolate the contribution to the Renyi entropy due to the corner. As a result, we uncover new universal numbers corresponding to the underlying low-energy theories that describe the critical behaviour.

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