Entanglement entropy of the large N Wilson-Fisher conformal field theory[1] SETH WHITSITT, Harvard Univ, WILLIAM WITCZAK-KREMPA, Universit de Montral, SUBIR SACHDEV, Harvard Univ — We compute the entanglement entropy of the Wilson-Fisher conformal field theory (CFT) in 2+1 dimensions with O(N) symmetry in the limit of large N for general entanglement geometries. We show that the leading large N result can be obtained from the entanglement entropy of N Gaussian scalar fields with their mass determined by the geometry. For a few geometries, the universal part of the entanglement entropy of the Wilson-Fisher CFT equals that of a CFT of N massless scalar fields. However, in most cases, these CFTs have a distinct universal entanglement entropy even at $N = \infty$. Notably, for a semi-infinite cylindrical region it scales as N^0 in the Wilson-Fisher theory, in stark contrast to the N-linear result of the Gaussian fixed point.

Seth Whitsitt
Harvard Univ

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