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Entanglement Entropy of the composite fermion non-Fermi liquid state at $\nu = 1/2$ JUNPING SHAO, Binghamton University, EUN-AH KIM, Cornell University — There has been much interest in entanglement entropy as a measure to theoretically probe strongly correlated states that do not involve broken symmetries. In particular, one may hope entanglement entropy can offer quantitative characteristic of Non-Fermi liquids which are otherwise defined based on "what they are not part of." Swingle and Senthil [1] conjectured that the entanglement entropy of non-Fermi liquids will be at most of order $L^{d-1} \log L$ for a region of linear size L. However, to date, there is no explicit calculation of entanglement entropy for non-Fermi liquids (though there are calculations for spin-liquids with spinon fermi surface). Here we perform a Monte Carlo calculation of the entanglement entropy for the best established example of strongly correlated non-Fermi liquid: gapless state at $\nu = 1/2$. We use a composite fermion many body wavefunction in a toroidal geometry and use the swap operator to calculate the second Renyi entropy. We discuss the resulting scaling behavior in the context of the Swingle-Senthil conjecture.

[1] B. Swingle and T. Senthil, arXiv:1112.1069.

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