

Abstract Submitted  
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**Entanglement negativity in free-fermion systems** PO-YAO CHANG, XUEDA WEN, SHINSEI RYU, University of Illinois at Urbana-Champaign — We derive a general formula of the logarithmic negativity in free-fermion systems, using the overlap matrix to construct the partially transposed reduced density matrix  $\rho_A^{TA_2}$  of a subsystem  $A = A_1 \cup A_2$ . In particular, we consider the negativity between two adjacent or disjoint regions in three systems: a homogeneous one-dimensional chain, the dimerized Su-Schrieffer-Heeger model, and the integer Quantum Hall state. For the negativity of two adjacent intervals in a homogeneous one-dimensional gas, we find agreement with the conformal field theory [P. Calabrese *et al.* Phys. Rev. Lett. **109**, 130502 (2012)]. On the other hand, the negativity for the integer quantum Hall states satisfies the area law. Our method is applicable to the study of the negativity in any free-fermion systems.

Po-Yao Chang  
University of Illinois at Urbana-Champaign

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