

Abstract Submitted
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Enhancing the thermal stability of entanglement between Majorana fermions with dipoles in optical lattices¹ VITO SCAROLA, FEI LIN, Virginia Tech — Pairing between spinless fermions can generate Majorana fermion excitations. Such excitations may exhibit intriguing properties arising from non-local entanglement, including anyonic braid statistics and enough stability to encode quantum information. But simple models indicate that non-local entanglement between Majorana fermions becomes unstable at non-zero temperatures. We discuss this issue and show that anisotropic interactions between dipolar fermions in optical lattices can be used to form domains that significantly enhance thermal stability. We construct a model of oriented dipolar fermions in a square optical lattice. We explicitly compute the correlation functions defining entanglement. We find that domains established by strong interactions exhibit enhanced entanglement between Majorana fermions over large distances and long times even at finite temperatures.

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Vito Scarola
Virginia Tech

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