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Massive Fermions with and without Symmetry breaking in 2d and 3d

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We study a strongly coupled lattice model containing two flavors of massless staggered fermions interacting via two types of interactions: (1) a current-current interaction involving a four-fermi term of the same flavour, and (2) an on-site four-fermion interaction involving two flavours. We study the model at strong coupling, where both these interactions dominated over the free hopping term. We find two massive fermion phases with two different mechanisms. In one phase fermions become massive through Spontaneous Symmetry Breaking (SSB) and in another phase, fermions get mass without any symmetry breaking. We study the model in both two and three space-time dimensions using the Monte Carlo worm algorithm, we find a second-order phase transition between two phases.

Session

Formal Theory

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