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Fermionic iPEPS with non-Abelian symmetries BENEDIKT BRUOGNOLO, JAN VON DELFT, ANDREAS WEICHSELBAUM, Ludwig Maximilians University, Munich, Germany — Tensor network (TN) techniques have emerged as one of the most promising tools to resolve many open questions in two-dimensional (2D) lattice models with fermions and frustration. An infinite projected entangled-pair state (iPEPS) represents a particularly versatile TN ansatz working directly in the thermodynamic limit, whose competitiveness has been demonstrated only recently in the context of the 2D t - J and Hubbard model [1,2]. Above all, this method makes it possible to study competing low-energy states by constraining specific unit-cell structures or by enforcing that the wavefunction breaks or conserves particular symmetries. In this work, we explore the benefits of conserving global non-Abelian symmetries in the iPEPS ansatz using the QSpace tensor library [3]. To this end, we study an iPEPS with $SU(2)$ spin rotation symmetry for interacting fermionic systems on the square lattice.

[1] P. Corboz, T. M. Rice, and M. Troyer, Phys. Rev. Lett. 113, 046402 (2014). [2] P. Corboz, Phys. Rev. B 93, 045116 (2016). [3] A. Weichselbaum, Ann. Phys. 327, 2972 (2012).

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