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General interaction-induced density wave states from a symmetry perspective J.W.F. VENDERBOS, IFW Dresden — We present a symmetry classification of particle-hole condensates, i.e. general density wave states, to show how an organization in terms of translational and point group symmetries provides immediate insight into the electronic properties of such states. We discuss site, bond and flux ordered density wave states in systems with square and hexagonal symmetry. We establish a robust connection between the transformation behavior under lattice symmetries of such density waves and the low-energy description of the electronic properties, which is independent of specific lattices and fully determined by symmetry. In addition, we show how an organization in terms of lattice symmetry is helpful in identifying and predicting electronic states matter with topological quantum numbers. For systems with hexagonal symmetry we propose a new class of time-reversal invariant spin-bond ordered density waves. We address how interactions may induce the formation of these density waves in real materials and make contact with recent works which indicate that symmetric density waves are good variational ground state candidates for interacting lattice fermion models.

J.W.F. Venderbos
Inst for Festkorper Werkstoffforschung

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