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Weak ergodicity breaking in multi-band fermionic systems

Zimo Sun,[1] Fedor Popov,[2] Igor Klebanov,[1] and Kiryl Pakrouski[3]

[1] *Princeton University*
[2] *New York University*
[3] *ETH Zurich*

Many-body scars are excited states that violate the Eigenstate Thermalization Hypothesis and are therefore responsible for weak ergodicity breaking. We extend the Group-Invariant formalism for constructing Hamiltonians with many-body scars to the multi-band electron systems. We derive the generalizations of the scar families known in the single-band case including the eta-pairing states. We demonstrate that most of the interactions that are usually considered in the context of unconventional superconductivity in materials do support many-body scars.