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Strong Spin-Orbit Coupling and Spin Liquids on the Triangular Lattice JASON IACONIS, Univ of California - Santa Barbara , GABOR HALASZ, Kavli Institute for Theoretical Physics, CHUNXIAO LIU, Univ of California - Santa Barbara, LEON BALENTS, Kavli Institute for Theoretical Physics — In recent years it has been realized that strong spin-orbit coupling can provide a new avenue in the search for spin liquid phases in experimentally realizable materials. A powerful tool in the study of such materials is found by looking at the different fully projected fermionic parton wave functions which are consistent with the projective symmetry group classification. Additionally, triangular lattice spin systems have long been seen as promising candidates to host such highly entangled phases of matter. To this end, we look at the full class of distinct nonmagnetic variational wave functions which are allowed on the triangular lattice when only the lattice symmetries are preserved. We use both analytic and numerical techniques to study the behavior of such spin systems when the interactions are highly anisotropic. We will, in particular, look at the various competitive spin liquid states and discuss possible connections to experimental systems.

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