

Abstract Submitted  
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**Extended spin ice** JEFFREY G. RAU, MICHEL J. P. GINGRAS, University of Waterloo — We introduce a new classical spin liquid on the pyrochlore lattice which we call ‘extended spin ice’. The ground state manifold of this model is extensive and characterized by a set of local rules that extend the conventional 2-in/2-out spin ice condition. This includes the ice states in addition to a complex set of tree structures built from 3-in/1-out, 3-out/1-in and all-in/all-out tetrahedra. Under local dynamics this model freezes heterogeneously at low temperatures into a ‘spin slush’, with extremely slow relaxation for some spins while other spin clusters fluctuate quickly. In addition to this dynamical heterogeneity, distinctive spherical patterns in the spin correlations serve as a further signature. Possible applications to materials as well the effects of transverse quantum exchange will be discussed.

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