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Bose metal phase in a simple honeycomb lattice model[1] CHRISTOPHER VARNEY, University of Massachusetts, Amherst / Georgetown University / University of Maryland, KAI SUN, VICTOR GALITSKI, University of Maryland, MARCOS RIGOL, Georgetown University — The existence of quantum spin liquids was first conjectured by Pomeranchuk some 70 years ago, who argued that frustration in simple antiferromagnetic theories could result in a Fermi-liquid-like state for spinon excitations. Here we present evidence that a simple quantum spin model on a honeycomb lattice hosts the long sought for Bose metal with a clearly identifiable Bose surface. The complete phase diagram of the model is determined via exact diagonalization and is shown to include four distinct phases separated by three quantum phase transitions. The stability of the Bose metal phase in the presence of other interactions is also discussed.

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