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Spin $S = 1$ "Quantum spin liquid": quantum criticality in 6H-B-$Ba_3NiSb_2O_9$ GANG CHEN, MICHAEL HERMELE, LEO RADZIHOVSKY, CU Boulder — We present a minimal model for a recently discovered material 6H-B-$Ba_3NiSb_2O_9$ which was proposed as a candidate for $S = 1$ quantum spin liquid on a triangular lattice. Our spin-1 model lies on a stacked multilayer triangular lattice. In our minimal model, we point out the competition between Heisenberg exchange interactions, which favor magnetic ordering, and the easy-plane single-ion anisotropy, which favors a uniform quantum paramagnetic state with $S^z = 0$ state at each site. We argue that the system is close to the quantum critical point separating these two phases and on the quantum paramagnetic phase side. Viewing the system as a three dimensional multilayer structure, we find that the frustrated interlayer and intralayer exchange interaction induces nodal lines of low energy spin excitations at the quantum critical point. Moreover, due to the quasi-2D nature of the system and proximity to the quantum critical point, we show there exists a broad intermediate temperature regime with linear temperature dependence of specific heat. Various other predictions and suggestions for experiments are discussed.

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