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A spin-orbit coupled triangular lattice quantum spin liquid in YbMgGaO₄: a semiclassical study YAO-DONG LI, Department of Computer Sciences, Fudan University, GANG CHEN¹, Department of Physics, State Key Laboratory of Surface Physics, Fudan University; Perimeter Institute for Theoretical Physics — Recently YbMgGaO₄ is proposed to be the first strong spin-orbit coupled quantum spin liquid candidate system that contains odd number of electron per unit cell with effective spin 1/2 local moments. In this talk we analyze the classical phase diagram of the most generic model that describes the Yb effective spin 1/2 local moments on the triangular lattice. We show the frustration is strong near the phase boundary between the 120 degree state and the stripe ordered phase. Further, we study the quantum fluctuation of the spin momentum by the linear spin wave theory and find that the magnetic order is destroyed in the strongly frustrated regimes of the phase diagram. Our result is compatible with the experimental results that suggest a quantum spin liquid ground state.

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