Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Exotic S=1 spin liquid state with fermionic excitations on triangular lattice MAKSYM SERBYN, SENTHIL TODADRI, PATRICK A. LEE, Massachusetts Institute of Technology — Motivated by recent experiments on the material $Ba_3NiSb_2O_9$ we consider a spin-one quantum antiferromagnet on a triangular lattice with the Heisenberg bilinear and biquadratic exchange interactions and a single-ion anisotropy. Using a fermionic "triplon" representation for spins, we study the phase diagram within mean-field theory. In addition to a fully gapped spin-liquid ground state, we find a state where one gapless triplon mode with Fermi surface coexists with $d + id$ topological pairing of the other triplons. Despite the existence of a Fermi surface, this ground state has fully gapped bulk spin excitations. Such a state has linear in-temperature specific heat and constant in-plane spin susceptibility, with an unusually high Wilson ratio.

Maksym Serbyn
Massachusetts Institute of Technology

Date submitted: 07 Nov 2011 Electronic form version 1.4