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Variational study of triangular lattice Heisenberg spin-1/2 model with ring exchanges and spin liquid state in κ -(ET)₂Cu₂(CN)₃ OLEXEI MOTRUNICH, KITP — We study triangular lattice spin-1/2 system with antiferromagnetic Heisenberg and ring exchanges using variational approach focusing on possible realization of spin liquid states. Trial spin liquid wave functions are obtained by Gutzwiller projection of fermionic mean field states and their energetics is compared against magnetically ordered trial states. We find that in a range of ring exchange coupling upon destroying the antiferromagnetic order, the best such spin liquid state is essentially a Gutzwiller-projected Fermi sea state. We propose this spin liquid with spinon Fermi surface as a candidate for the nonmagnetic insulating phase observed in the organic compound κ -(ET)₂Cu₂(CN)₃, and describe some experimental consequences of this proposal.

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