Dynamics of the Spin Liquid Phase of Cs$_2$CuCl$_4$. OOKIE MA, MARC-ANDRE VACHON, VESNA F. MITROVIĆ, BRAD MARSTON, Brown University — The dynamics of a spin-liquid phase of an antiferromagnet on the anisotropic triangular lattice and in a magnetic field are studied with a combination of Gutzwiller-projected wavefunctions and mean-field theory. Candidate ground states that support fermionic gapless spinon excitations include four different U(1) spin liquids. The lattice and the states interpolate between limiting cases of 1D decoupled chains ($J/J' = 0$) and the isotropic 2D square lattice ($J/J' = \infty$). Parameters of the mean field theory are chosen to minimize the ground state energy of the corresponding Gutzwiller-projected wavefunction. The spin-lattice relaxation rate $1/T_1$, calculated within the mean-field approximation, is compared to NMR measurements in the spin liquid phase of Cs$_2$CuCl$_4$.

1Supported in part by NSF grant no. DMR-0605619.

Date submitted: 03 Dec 2007