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Quantum phase transitions in Heisenberg $J_1 - J_2$ triangular antiferromagnet in a magnetic field MENGXING YE, ANDREY CHUBUKOV, Univ of Minnesota - Twin Cities — We present the zero temperature phase diagram of a large S Heisenberg antiferromagnet on a frustrated triangular lattice with nearest neighbor (J_1) and next nearest neighbor (J_2) interactions, in a magnetic field. We show that the classical model has an accidental degeneracy for all J_2/J_1 and all fields, but the degeneracy is lifted by quantum fluctuations. We show that at large S, for $J_2/J_1 < 1/8$, quantum fluctuations select the same sequence of three sublattice co-planar states in a field as for $J_2 = 0$, and for $1/8 < J_2/J_1 < 1$ they select the canted stripe state for all non-zero fields. The transition between the two states is first order in all fields, with the hysteresis width set by quantum fluctuations. We also study the model with arbitrary S, including $S = 1/2$, near the saturation field by exploring the fact that near saturation the density of bosons is small for all S. We show that for $S > 1$ the transition remains first order, with a finite hystresis width, but for $S = 1/2$ and, possibly, $S = 1$, there appears a new intermediate phase, likely without a spontaneous long-range order.

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