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A Schwinger boson mean field study of the J_1-J_2 Heisenberg triangular-lattice quantum antiferromagnet DAG-VIDAR BAUER, JOHN OVE FJAERESTAD, Department of Physics, Norwegian University of Science and Technology, N-7041 Trondheim, Norway — We use Schwinger boson mean field theory to study the ground state of the spin-S triangular-lattice Heisenberg model with nearest (J_1) and next-nearest (J_2) neighbor antiferromagnetic interactions, treating $\kappa = 2S$ as a continuous parameter. We consider two spin liquid Ansatze whose magnetically ordered versions correspond to 120-degree order and a a collinear "stripe" order, respectively. For $\kappa = 1$ there is a direct transition between these ordered states as J_2/J_1 increases. Motivated by an argument that a smaller κ may be more appropriate for describing the $S = 1/2$ case qualitatively, we find that as one lowers κ, a spin liquid region eventually opens up between the ordered phases, in qualitative agreement with various recent numerical studies of the $S = 1/2$ model. This picture suggests a symmetric gapped Z_2 spin liquid which is the disordered version of the 120-degree ordered state.

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