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Contribution ID: **3921** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Nematic and fluctuation-induced first-order phase transitions in AB-stacked kagome bilayers

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We present the results of a finite-temperature study of a Heisenberg-Dzyaloshinskii-Moriya Hamiltonian on AB-stacked kagome bilayers. We develop an exact analytical coarse-graining procedure to map the microscopic Hamiltonian onto a generalized XY model on a triangular lattice. To leading order, the effective XY model includes both bilinear and biquadratic interactions. In a large portion of the parameter space, the biquadratic couplings dominate in the system, leading to two phase transitions: a high-temperature nematic, and a low-temperature Ising transition. In bilayer systems, these transitions are accompanied respectively by the binding/unbinding of half-integer or integer topological vortex defects. Furthermore, we show that when the ground state is incommensurate, thermal fluctuations change the nature of the low-temperature transition from continuous to first-order. These predictions are confirmed by the numerical Monte-Carlo finite-size analysis.

Keyword-1

Kagome

Keyword-2

Nematic

Keyword-3

Phase transitions

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