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Quantum order-by-disorder in an extended Shastry-Sutherland model KEOLA WIERSCHEM, PINAKI SENGUPTA, Nanyang Technological University — We show two examples of quantum order-by-disorder processes in an extended Shastry-Sutherland model. This model incorporates uniaxial exchange anisotropy along with additional next-nearest-neighbor bonds not present in the canonical Shastry and Sutherland model. Moreover, the transverse component of exchange is ferromagnetic, while the longitudinal component remains antiferromagnetic. This guarantees the model to be free of the quantum Monte Carlo sign problem, and we thereby explore two regions of the phase diagram that display the order-by-disorder phenomenon. In the first instance, we show that quantum fluctuations can turn a highly degenerate solid phase into a supersolid phase with higher degrees of diagonal order than the solid phase. In the second instance, the highly degenerate states along a phase boundary are lifted by quantum fluctuations and replaced by a striped solid phase.

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