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Quantum quasicrystals and other exotic states of spin-orbit coupled dipolar bosons SARANG GOPALAKRISHNAN, Harvard University, RYAN WILSON, BRANDON ANDERSON, NIST, JQI, and University of Maryland, BENJAMIN LEV, Stanford University, CHARLES CLARK, NIST, JQI, and University of Maryland, IVAR MARTIN, Argonne National Laboratory, EUGENE DEMLER, Harvard University — We study dipolar Bose gases in which the bosons experience a Rashba spin-orbit coupling. We show that the degenerate dispersion minimum due to the spin-orbit coupling, combined with the long-range dipolar interaction, can stabilize a rich phase diagram including a number of exotic phases, such as a quantum quasicrystal [1] (in the quasi-2D limit) and a meron state [2] (in the 3D limit), as one tunes the strength of the dipolar interaction and the spin-orbit coupling. We discuss specific level schemes for exploring this phase diagram using ultracold dysprosium. [1] S. Gopalakrishnan, I. Martin, and E.A. Demler, Phys. Rev. Lett. 111, 185304 (2013) [2] R.M. Wilson, B.M. Anderson, and C.W. Clark, Phys. Rev. Lett. 111, 185303 (2013)

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