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Finite Temperature RPA Calculations of 2D Dipolar Bosons at Arbitrary Tilt Angles PENGTAO SHEN, KHANDKER QUADER, Department of Physics, Kent State University, Kent, OH 44242 — We present finite-T Random Phase Approximation (RPA) calculations on a system of 2D dipolar bosons, with dipoles oriented at an angle to the direction perpendicular to the confining 2D plane. Our calculations are done over a wide range of density, temperature, and dipolar strength, for various dipolar tilt angles. For a given temperature, we find the system to be in a quasi-condensate phase, which undergoes a collapse transition at large tilt angles, and a finite momentum instability, signaling a striped phase, at sufficiently large values of dipolar coupling strength. Within RPA, we also consider the effect of additional repulsive and attractive contact interactions. Finally, we explore the effect of a trap on the 2D system. We construct phase diagrams depicting the phases and instabilities. We discuss how our results may apply to ultracold dense Bose gas of polar molecules, such as $^{41}K^{87}Rb$, that has been realized experimentally.

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