

Abstract Submitted
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Properties of a dipolar condensate with three-body interactions¹

PETER BLAKIE, University of Otago — We discuss the properties of a harmonically trapped dilute dipolar condensate with a short ranged conservative three-body interaction. We show that this system supports two distinct fluid states: a usual condensate state and a self-cohering droplet state. We develop a simple model to quantify the energetics of these states, which we verify with full numerical calculations. Based on our simple model we develop a phase diagram showing that there is a first order phase transition between the states. Using dynamical simulations we explore the phase transition dynamics, revealing that the droplet crystal observed in previous work is an excited state that arises from heating as the system crosses the phase transition. Utilising our phase diagram we show it is feasible to produce a single droplet by dynamically adjusting the confining potential.

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