

Binary supersolids in dipolar condensate mixtures

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Two-component dipolar condensates are now experimentally producible, and we theoretically investigate the nature of supersolidity in this system. In dipole-imbalanced situations we predict the existence of a binary supersolid state in which the two components form a series of alternating immiscible domains. In stark contrast to single-component supersolids, binary supersolids do not require quantum stabilization, and the number of lattice sites is hence not strictly limited by the condensate populations. While rich phase diagrams, phase transitions and excitations are anticipated, our results are applicable to a wide range of dipole moment combinations and mark an important step towards long-lived bulk supersolidity.

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