Abstract Submitted
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Quantum crystals in a trapped Rydberg-dressed Bose-Einstein condensate[1] C.-H. HSUEH, Department of Physics, National Taiwan Normal University, T.-C. LIN, Department of Mathematics, National Taiwan University, T.-L. HORNG, Department of Applied Mathematics, Feng Chia University, W.C. WU, Department of Physics, National Taiwan Normal University — Spontaneously crystalline ground states, called quantum crystals, of a trapped Rydberg-dressed Bose-Einstein condensate are numerically investigated. As a result described by a mean-field order parameter, such states simultaneously possess crystalline and superfluid properties. A hexagonal droplet lattice is observed in a quasi-two-dimensional system when dressing interaction is sufficiently strong. Onset of these states is characterized by a drastic drop of the non-classical rotational inertia proposed by Leggett [Phys. Rev. Lett. **25**, 1543 (1970)]. In addition, an AB stacking bilayer lattice can also be attained. Due to an anisotropic interaction possibly induced by an external electric field, transition from a hexagonal to a nearly square droplet lattice is also observed.

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