

Abstract Submitted  
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**Spin-squeezed atomic crystal** EMILIA WITKOWSKA, DARIUSZ KAJTOCH, Institute of Physics Polish Academy of Sciences, ALICE SINATRA, Laboratoire Kastler Brossel, ENS — We propose a method to obtain a regular arrangement of two-level atoms in a three-dimensional optical lattice with unit filling, where all the atoms share internal state coherence and metrologically useful quantum correlations. Such a spin-squeezed atomic crystal is obtained by adiabatically raising an optical lattice in an interacting two-component Bose-Einstein condensate. The scheme could be directly implemented on a microwave transition with state-of-the-art techniques and used in optical-lattice atomic clocks with bosonic atoms to strongly suppress the collisional shift and benefit from the spins quantum correlations at the same time.

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