

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Large spin magnetism with cold atoms BRUNO LABURTHE-TOLRA, Universite Paris and CNRS — The properties of quantum gases made of ultra-cold atoms strongly depend on the interactions between atoms. These interactions lead to condensed-matter-like collective behavior, so that quantum gases appear to be a new platform to study quantum many-body physics. In this seminar, I will focus on the case where the atoms possess an internal (spin) degrees of freedom. The spin of atoms is naturally larger than that of electrons. Therefore, the study of the magnetic properties of ultra-cold gases allows for an exploration of magnetism beyond the typical situation in solid-state physics where magnetism is associated to the $s=1/2$ spin of the electron. I will describe three specific cases : spinor Bose-Einstein condensates, where spin-dependent contact interactions introduce new quantum phases and spin dynamics ; large spin magnetic atoms where strong dipole-dipole interactions lead to exotic quantum magnetism ; large spin Fermi gases.

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Date submitted: 09 May 2016

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