

## **A mesoscopic gas of spin 1 bosons**

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In this talk, I will present a set of experiments done at Laboratoire Kastler Brossel (ENS Paris) on the magnetic properties of ultracold bosons. After a brief introduction to ultracold gases, I will present an experimental study of the phase diagram of spin-1 bosons with antiferromagnetic interactions, highlighting the similarities and differences with other antiferromagnetic systems, like spin 1/2 on a lattice with antiferromagnetic Heisenberg interactions. I will discuss in details the behavior of the system for small magnetic fields and magnetizations, where anomalously large fluctuations are observed. We show they can be explained by collective spin fluctuations, that would vanish in the thermodynamic limit but are important due to the small size (atom number~few thousands) of the samples we study. This illustrates on a particular example how fluctuations in small systems are effective to counter symmetry breaking.