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### Quantum-enhanced detection of atomic spins

Sensitive detection of atomic spins is of relevance in a wide range of applications from the preparation of quantum states of matter to the implementation of atomic clocks and magnetometers. Equally attractive are those applications relying on unpolarized spins, for which statistical fluctuations in the spin orientation yield the signal. Optical detection schemes based on Faraday rotation (FR), in which the spin state is mapped onto the polarization of an off-resonant probe, are particularly attractive. I will describe our experimental efforts at ICFO to detect polarized and unpolarized alkali vapors using FR with both classical and non-classical light. Most of our experiments are performed at large alkali densities, thus we explore the interesting regime where spin-exchange collisions can drive the spin dynamics. Applications exploiting this regime will be discussed.

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