Prospects for a Cesium interferometer with tunable interactions

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Ultra-cold atomic quantum gases have gained relevance in the field on metrology through applications of interferometry in gravimetric sensing or as atomic clocks. Our effort in building a Cesium-based BEC interferometer aims at exploring the physical constraints of interferometry with Bose Einstein condensates, and pushing the respective technological limits. Our system of choice is an optically trapped Cesium BEC, which will be transferred in a double well potential as first step of an interferometric sequence. The separated BECs will then experience an individual phase evolution driven by the local energy scales, before the relative phase is retrieved in a recombination step. Such interferometers face a known major hurdle to reach long phase coherence times above 100 milliseconds, in order to be competitive with other systems: even small number imbalances during the splitting process lead to an interaction induced phase diffusion. We want to improve on the phase coherence time by tuning the atomic interactions close to zero. Cesium is a promising candidate for such a system as it offers tunable interactions at low static magnetic fields, featuring a zero in scattering length at only 17 G. The poster will present the status of our compact experimental setup, and give a systematic overview of the energy scales involved. As a test case, the implementation of a quantum tilt meter will be discussed.