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Preparation of Bose Einstein condensates in realistc trapping potentials for precision atom interferometry KATERINE POSSO TRUJILLO, ERNST M. RASEL, NACEUR GAALOUL, Univ Hannover, QUANTUS TEAM — Preparation of Bose Einstein condensates in realistc trapping potentials for precision atom interferometry Theoretical studies of the ground state and the dynamical properties of Bose Einstein condensates (BECs) are typically realized by considering the ensemble as being initiaally trapped by a harmonic potential. Dramatic discrepancies were found by comparing numerical results of the long-time expansion of BECs after being released from the harmonic trap, and measurements of the free evolution and delta-kick cooling (DKC) of a ^{87}Rb BEC on large timescales of up to 2 s in micro-gravity (micro-g) environment such as those performed in the QUANTUS project from our group [1]. The modification in the dynamics of a ^{87}Rb BEC with the application of DKC by using experimentally implemented trapping geometries and the effect of gravity have been studied. Three different configurations have been considered: atom chip-based potential, dipole trap and the time-averaged orbiting potential. Such discrepancies may be crucial in high precision atom interferometry experiments in micro-g and zero-g platforms in which the implementation of DKC is mandatory to achieve the long-expansion times required. [1] H. Mntinga et al., Phys. Rev. Lett. vol. 110 093602 (2013).

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