

# Degenerate gases at the frontiers of matter-wave interferometry

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Long drift times of several seconds promise to boost the current performance of atom interferometers by orders of magnitude in probing fundamental laws of physics or measuring inertial forces. To take advantage of the available free fall time, the choice of degenerate gases as slowly expanding sources is natural. Novel methods of quantum engineering experimentally realized within the QUANTUS and MAIUS collaboration such as collimation to the pK level or beam splitters with thousands of photon recoils, will be presented in this contribution. Based on this, present and future scenarii for micro-g or space experiments aiming to test Einstein's equivalence principle at levels better than  $10^{-15}$ , and detect gravitational waves with high accuracy will be detailed.

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