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Concepts and technology development towards a platform for macroscopic quantum experiments in space RAINER KALTENBAEK, Univ of Vienna — Tremendous progress has been achieved in space technology over the last decade. This technological heritage promises enabling applications of quantum technology in space already now or in the near future. Heritage in laser and optical technologies from LISA Pathfinder comprises core technologies required for quantum optical experiments. Low-noise micro-thruster technology from GAIA allows achieving an impressive quality of microgravity, and passive radiative cooling approaches as in the James Webb Space Telescope may be adapted for achieving cryogenic temperatures. Developments like these have rendered space an increasingly attractive platform for quantum-enhanced sensing and for fundamental tests of physics using quantum technology. In particular, there already have been significant efforts towards ralizing atom interferometry and atomic clocks in space as well as efforts to harness space as an environment for fundamental tests of physics using quantum optomechanics and high-mass matter-wave interferometry. Here, we will present recent efforts in spacecraft design and technology development towards this latter goal in the context of the mission proposal MAQRO.

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