

# Quantum technology on GNSS

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More than 160 spacecrafts for global and regional navigation services (GNSS) are orbiting the Earth presently. As a result of fundamental research (quantum optics and gravitational physics), quantum technology are directly applied to the future GNSS-fleets and -constellations, vice versa the increasing precision of GNSS-systems can be used for fundamental physics experiments as well.

But quantum technology is not only used for navigation satellites. It is even applied on space platforms for carrying out many experiments for fundamental research, e.g. the ultra-precise observation of gravitational fields which has to be determined by measuring time, distances and accelerations, and by comparing the results in different inertial frames. During the last 15 years quantum optics and quantum engineering seemed and seems to become a powerful tool for inertial sensing in space. Space provides the possibility of carrying out quantum experiments over very large distances, along spacecraft orbits with highly varying velocities, and under weightlessness conditions resulting in long interrogation times. On the other side, quantum technology whose development has been mainly driven by scientific needs is expected to be used even for earth observation, satellite communication, and satellite geodesy.

The talk will focus on present and future application fields of quantum sensors and quantum technology in space and will give an overview of recent and past experiments in space.