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PTB's Second-Generation Transportable Strontium Lattice Clock

Due to the gravitational redshift, clocks can be utilized for height determination in geodesy. To become geodetically relevant, fractional clock frequency differences of about 1×10^{-18} need to be resolvable. Our second-generation transportable strontium lattice clock represents our recent efforts in reaching the required level of accuracy with an in-field deployable device. These include a single-beam pyramid magneto-optical trap for robust cooling and trapping of strontium-87 atoms, a blackbody radiation (BBR) shield for fractional BBR shift uncertainties below 1×10^{-18} and a transportable clock laser with an instability in modified Allan deviation of down to 1.6×10^{-16}.

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