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ACES: Testing general relativity with cold-atom clocks in space

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Atomic Clock Ensemble in Space (ACES) is developing a cold-atom clock and high-performance links to test general relativity from the International Space Station. With a fractional frequency instability and inaccuracy of 1x10^{-16}, the ACES clock signal will establishing a worldwide network to compare clocks in space and on ground. ACES will provide an absolute measurement of Einstein's gravitational redshift, it will search for time variations of fundamental constants, contribute to test topological dark matter models, and perform Standard Model Extension tests. The network of ground clocks participating to the ACES mission will additionally be used to compare clocks over different continents and measure geopotential differences at the clock locations. The flight model of the ACES payload is close to completion. System tests have already confirmed the performance of the clock signal distributed by ACES. The microwave time and frequency link is currently under test. The single-photon avalanche detector of the ACES optical link has been tested successfully.
The ACES mission concept, its scientific objectives, and the recent test results will be presented together with the major milestones that will lead us to the ACES launch

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