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A compact laser-cooled atomic clock with a loop-gap cavity

We introduce a compact atomic clock based on laser-cooled atoms trapped inside a loop-gap microwave cavity. The cavity occupies a volume eight times smaller than conventional cylindrical cavities with ten apertures required for optical manipulation of cold atoms. The measured linewidth of the central Ramsey spectrum was 19.6 Hz. The corresponding frequency instability was $4.5\times10^{-13-1/2}$, which could be further improved by optimizing experimental parameters. We expect this type of physics package to be utilized for various portable applications of atomic clocks including onboard atomic clocks for navigation satellite.

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