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Microfabricated surface-electrode ion trap for frequency metrology

With outstanding systematic uncertainties at the 10^{-18} level or below optical atomic clocks surpass the best cesium clocks that currently define the time unit. With the related impact on various applications, a growing number of laboratories around the world are developing transportable optical clocks. We are developing a single-ion optical clock targeting a total volume well below 500 L. The core of the experiment is a surface-electrode trap that operated with $^{171}Yb^{+}$ ions on the quadrupole transition at 435.5 nm. We have developed a custom micro-fabricated trap and a custom resonant RF circuit with a high quality factor for optimal trapping and electric field noise filtering. We will present our trap design and characterization, our RF circuit design and test results as well as our latest experimental results.

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