Abstract Submitted
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Testing Lorentz invariance using rotating cryogenic sapphire oscillators[1] STEPHEN PARKER, The University of Western Australia, MORITZ NAGEL, EVGENY KOVALCHUK, Humboldt University of Berlin, PAUL STANWIX, EUGENE IVANOV, JOHN HARTNETT, The University of Western Australia, ACHIM PETERS, Humboldt University of Berlin, MICHAEL TOBAR, The University of Western Australia — A cryogenic sapphire oscillator exploits the remarkable properties of sapphire dielectric at low temperatures to generate a microwave frequency signal with a fractional frequency stability of parts in 10^{-16} for integration times on the order of hundreds of seconds. We describe an experimental test of Lorentz invariance in electrodynamics that searches for orientation dependent deviations in the speed of light by comparing the frequencies of two actively rotated orthogonally aligned cryogenic sapphire oscillators. Data has been collected for over one year allowing us to set the most stringent laboratory bound on the isotropy of the speed of light and constrain multiple Lorentz violating parameters of a Standard Model extension framework.

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