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Strontium clock comparisons and prospects at LNE-SYRTE ULRICH EISMANN, CHUNYAN SHI, MIKHAIL GUROV, RODOLPHE LE TARGAT, JÉRÔME LODEWYCK, YANN LE COQ, JOCELYNE GUÉNA, MICHEL ABGRALL, PETER ROSENBUSCH, GIOVANI-DANIELE ROVERA, SÉBASTIEN BIZE, PHILIPPE LAURENT, LNE-SYRTE, CNRS, UPMC, Observatoire de Paris, 61 Avenue de l'Observatoire, 75014 Paris, France — Recently, the caesium fountain clocks currently defining the SI second have been superseded in both stability and accuracy by atomic clocks referenced to optical transitions. Here we present frequency comparisons between two similar state-of-the-art strontium optical lattice clocks. The clocks are in agreement within their accuracy budget with a total uncertainty of 1.6×10^{-16}. A reproducible link is established between the strontium clock frequency and the current definition of the SI second by consistent comparisons of these clocks with three of the best caesium fountains. The measured strontium clock frequency is 429 228 004 229 873.10 Hz, with a total uncertainty of 3.1×10^{-16} henceforth limited by the accuracy of the microwave clocks. Furthermore, we will discuss the prospects for improving the accuracy and stability of strontium optical lattice clocks. Currently, the largest contribution to the error budget is the light shift related to black-body radiation from the vacuum vessel surrounding the trap. A new-generation vacuum vessel with a well controlled temperature will allow to bring the accuracy into the low 10^{-17} range.

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