



Remote frequency measurement of the 1S0-3P1 transition in laser cooled Mg-24

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We perform Ramsey-Bord'e spectroscopy on laser-cooled magnesium atoms in free fall to measure the 1S0 \rightarrow 3P1 intercombination transition frequency. The measured value of 655 659 923 839 730 (48) Hz is consistent with our former atomic beam measurement (Friebe et al 2008 Phys. Rev. A 78 033830). We improve upon the fractional accuracy of the previous measurement by more than an order of magnitude to 7e-14. The magnesium frequency standard was referenced to a fountain clock of the Physikalisch-Technische Bundesanstalt (PTB) via a phase-stabilized telecom fiber link and its stability was characterized for interrogation times up to 8000 s. The high temperature of the atomic ensemble leads to a systematic shift due to the motion of atoms across the spectroscopy beams. In our regime, this leads to a counterintuitive reduction of residual Doppler shift with increasing resolution. Our theoretical model of the atom-light interaction is in agreement with the observed effect and allows us to quantify its contribution in the uncertainty budget.

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