Improved Measurement of the 1s2s $^1S_0$ - 1s2p $^3P_1$ Interval in Helium-like Silicon

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To provide a high precision test of two-electron atomic theory at $Z\alpha \sim 0.1$ we have remeasured the 1s2s $^1S_0$ - 1s2p $^3P_1$ interval in Si^{12+} [**?**]. Our result is 7230.585(6) cm^{-1} and improves on our previous measurement [**?**] by a factor of 30. Helium-like ions in the 1s2s $^1S_0$ state were produced by foil stripping a 29 MeV silicon ion beam. The ion beam was merged with the standing wave in a high-finesse laser power-build-up cavity and transitions to the 1s2p $^3P_1$ level were detected by observing the subsequent x-ray decay to the ground-state. Uncertainty due to the doppler shift was greatly reduced by alternately inducing transitions, at nearly the same beam velocity, using the co- and counter-propagating waves in the build-up cavity when excited by single-frequency lasers at 1319 nm and 1450 nm, respectively.

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[1] T.R. DeVore, D.N. Crosby and E.G. Myers, submitted to Phys. Rev. Lett.

[2] M. Redshaw and E.G. Myers, Phys. Rev. Lett. **88**, 023002 (2001).