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Doppler-free two-photon spectroscopy of Cs $6S_{1/2}$-$7D_{3/2,\,5/2}$ transition[1] CHIN-CHUN TSAI, YI-HSIU CHANG, YING-YU CHEN, Department of Physics, National Cheng-Kung University, Taiwan, YI-CHIH LEE, HSIANG-CHEN CHUI, Institute of Electro-Optical Science and Engineering, National Cheng-Kung University, Tsaiwan — High-Resolution Doppler-free two-photon spectra of the $|6S_{1/2}, F\rangle - |7D_{3/2,5/2}, F\rangle$, transition in cesium are observed using a Ti-Sapphire laser. A repeat two- photon spectrum is used as a frequency maker with signals recorded from the zero- and first-order laser beams generated by an acousto-optic modulator. The hyperfine coupling constants A (magnetic dipole constant) and B (electric quadrupole constant) are determined using spectral line splittings, giving $A = 7.12(07)\,MHz$, and $B = 0.29(89)\,MHz$ for the $7D_{3/2}$ level, and $A = -1.57(13)\,MHz$, and $B = -0.54(64)\,MHz$ for the $7D_{5/2}$ level. To authors knowledge, these hyperfine two- photon transitions have been observed for the first time. These spectra can be used as an optical frequency standard in the near-infrared region of 767 nm.

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