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Measurement of the Lifetimes of the 1Do2 -> 3P 0,1,2 Intersystem transition of Mg 6+

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Measurements are being made of lifetimes of metastable levels of singly and multiply charged ions which contribute to optical absorption, emission and energy balance in the ISM, stellar atmospheres, etc. The JPL electron cyclotron resonance ion source provides microampere currents of charge states such as C6+ and Mg6+. Ions are injected into a Kingdon trap and stored for times longer than their metastable lifetimes (0.001 - 1 sec). Decay channels include intercombination E1, electric quadrupole E2, and magnetic dipole M1. The UV emissions are detected by an interference filter and phototube using a UV grade optical system. For wavelengths less than 180 nm, a cesium-iodide coated microchannel plate enhanced for UV performance is used. The Kingdon trap, constructed in collaboration with Texas A&M University[1] has been installed on a dedicated beam line. New measurements of the lifetimes of the 1Do2 -> 3P0,1,2 intersystem transitions of Mg 6+ at 250.92 nm and 262.91 nm will be presented. Results are compared with theoretical calculations[2]. This work was carried out at JPL/Caltech and supported through agreement with NASA.

[1] L. Yang and D.A. Church, Phys. Rev. Lett. 70, 3860 (1993). [2] C. Froese, Astrophys. J. 145, 932 (1966)

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