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Suppression of Allowed Transitions in Al-like Krypton (Kr^{23+}) Due to the Presence of a Magnetic Dipole Transition in the $3s^2 3p\ ^2P$ Ground Term[1] JOSEPH READER, YURI PODPALY, YURI RALCHENKO, JOHN GILLASPY, National Institute of Standards and Technology — Extreme ultraviolet spectra of highly charged krypton atoms were produced with an electron beam ion trap (EBIT) and recorded with a flat-field grazing-incidence spectrometer. The wavelength range was 3-18 nm. Wavelength calibration was provided by known lines of highly ionized Kr as well as spectra of C, O, Xe, and Ba. The observed spectra were interpreted with the aid of collisional-radiative modeling of the EBIT plasma. For the Al-like ion Kr^{23+} the allowed resonance lines $3s^2 3p\ ^2P$-$3s^2 3d\ ^2D$ exhibited extreme deviation from the normal ratios for lines of this multiplet. In particular, the $^2P_{3/2}$-$^2D_{5/2}$ transition, normally the strongest, was observed to be the weakest. This effect was explained by the fact that in the low electron density environment of EBIT the $^2D_{5/2}$ level is primarily populated by electron excitation from $^2P_{3/2}$. However, the presence of a magnetic dipole M1 transition $3s^2 3p\ ^2P_{1/2}$-$^2P_{3/2}$ reduces the population of $^2P_{3/2}$ and hence the population of $^2D_{5/2}$. We are conducting further modeling with varying electron density to try to reproduce the observed line ratios. This could serve as a diagnostic tool for determining electron density in EBIT and fusion energy devices.

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