

# Laboratory Measurement and Theoretical Modeling of K-shell X-ray Lines from Inner-shell Excited and Ionized Ions of Oxygen

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## Abstract

We present high resolution laboratory spectra of K-shell X-ray lines from inner-shell excited and ionized ions of oxygen, obtained with a reflection grating spectrometer on the electron beam ion trap (EBIT-I) at the Lawrence Livermore National Laboratory. Only with a multi-ion model including all major atomic collisional and radiative processes, are we able to identify the observed K-shell transitions of oxygen ions from O III to O VI. The wavelengths and associated errors for some of the strongest transitions are given, taking into account both the experimental and modeling uncertainties. The present data should be useful in identifying the absorption features present in astrophysical sources, such as active galactic nuclei and X-ray binaries. They are also useful in providing benchmarks for the testing of theoretical atomic structure calculations.

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