

Two-photon Excitation of high-lying 4d levels in FeII and oscillator strengths for non-LTE stellar atmosphere models

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We report on experimental lifetimes for high-excitation 4d levels in FeII and oscillator strengths for the 4p-4d decays from these levels. These transitions are of importance for abundance studies and for non-LTE stellar atmosphere model. One step excitations can reach odd parity levels in the FeII energy level system. However, for higher excitation even parity levels, such as 4d or 5s, processes involving multiple photons must be used. We have utilized two-photon excitation, where the upper level has same parity as the lower level and the energy of the exciting laser tuned to half of the transition energy. The radiative lifetimes are combined with relative intensities for the decay channels, as measured from FTS spectroscopy of a hollow cathode discharge lamp.

We discuss the technique, report on experimental values and comparisons with calculations, and applications to stellar spectroscopy.