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THE IRON PROJECT: ATOMIC RADIATIVE PROCESSES IN ASTROPHYSICAL PLASMAS

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The IRON PROJECT (IP, Hummer et al 1993) is an extension of the international OPACITY PROJECT (OP, Seaton et al 1994) and consists of approximately 20 atomic physicists and astrophysicists. In contrast to the OP which concerned the atomic radiative processes and opacities, IP emphasizes on both collisional and radiative processes for astrophysically important elements, iron and **iron peak** elements. in particular Fe in all ionization stages. IP aims in development and application of new methods in theoretical atomic physics to calculation of large-scale atomic data of high accuracy. The calculations are carried out in the close coupling approximation using the R-matrix method and its relativistic extension, the Breit-Pauli R-matrix (BPRM) method.

The atomic processes of interest are: electron impact excitation, photoionization, transition probabilities, and electron-ion recombination of most astrophysically abundant elements. The wavelengths encompass a wide range in the spectrum, from x-ray to infrared lines. I will discuss the three radiative processes. We calculate photoionization cross sections and recombination rate coefficients of ground and all excited levels up to n = 10 and consider radiative transitions of fine structure levels. Recently we have extended the unified method for the total electron-ion recombination to study the satellite lines. I will present sample results.

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