

"High Accuracy Atomic Physics in Astronomy", IP/ITAMP workshop, August 7-9, 2006, The Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, in honor of Prof. Micheal J. Seaton

ANALYSIS OF FE XVI SPECTRA : ATOMIC STRUCTURE CALCULATION USING RELATIVISTIC COUPLED CLUSTER THEORY

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The study of atomic transition in the ion FeXVI is a subject of considerable interest in many fields specially to astrophysics and plasma physics. High resolution spectral information is available for this ion from astrophysical observations but the theoretical study for this particular ion is not very accurate. Mainly the theoretical results are limited to the well known SUPERSTRUCTURE , CIV3 and GRASP codes for the energy levels and distorted wave and Dirac R-matrix (DARC) calculations for the electron scattering collision strengths. Recently many-body perturbation theory (MBPT) has been applied to determine the inner shell absorption lines for this ion.

Here we have used the coupled cluster method (CCM), one of the most accurate many-body theories applied to atomic systems. CCM considers all order perturbation of the Coulomb interaction way and its a generalization of the MBPT technique. Therefore it is more precise and accurate. We have calculated the energy levels, electric dipole transition probabilities and oscillator strengths for few low lying excited states in a full-relativistic way. A comparative study has been made with the available data for this ion relevant to the iron project.