Abstract Submitted for the DAMOP06 Meeting of The American Physical Society

Electron collisions with Fe-peak elements: Fe V B.M. MCLAUGH-LIN, P.H. NORRINGTON, A. HIBBERT, M.P. SCOTT, P.G. BURKE, Queen's University Belfast, V.M. BURKE, C.J. NOBLE, CCLRC Daresbury Laboratory -Lines of $Fe^+ - Fe^{6+}$ ions appear in the UV spectra of O-type stars. Accurate assessments of the relevant abundances of heavy elements and their ions can be obtained from the comparison of the observed spectra with synthetic NLTE spectra, if the atomic data for electron and photon interaction processes are known with sufficient accuracy. Electron-impact excitation collision strengths for the Fe-peak element Fe^{4+} are calculated in the close-coupling approximation using the *R*-matrix suite of codes PRMAT. Eighty LS - coupled states arising from the $3d^4$, $3d^34s$ and $3d^34p$ configurations of Fe⁴⁺ are retained in our calculations. Accurate multi-configuration interaction target and scattering wavefunctions are used with the aid of $3p^2 \rightarrow 3d^2$ two-electron promotions and a n=4 basis set. Effective collision strengths for optically forbidden transitions in the $3d^4$ manifold, which are extremely important in the analysis of lines in the Fe⁴⁺ spectra, are obtained by averaging the electron collision strengths over a Maxwellian distribution for the electron temperature. The present results when compared to previous investigations for temperatures below 100,000 Kelvin show an enhancement of a factor of two. Further details will be presented at the meeting.

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