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An intermediate-coupling R-matrix calculation of electron-impact excitation of Fe^{4+}[1] DONALD GRIFFIN, Rollins College, CONNOR BALLANCE, Auburn University — For a number of years, there has been a major effort to calculate electron-impact excitation data for every ion stage of iron embodied by the ongoing efforts of the IRON project [1993 *Astron. Astrophys.* **279** 298]. Due to the complexity of the targets, calculations for the lower stages of ionization have been limited to either intermediate-coupling calculations within the ground-configurations or *LS*-coupling calculations of the ground and excited configurations. However, accurate excitation data between individual levels within both the ground and excited configurations of the low charge-state ions are urgently required for applications to both astrophysical and laboratory plasmas. Here we report on the results of the first intermediate-coupling *R*-matrix calculation of electron-impact excitation for Fe^{4+} for which the close-coupling (CC) expansion includes not only those levels of the $3d^4$ ground configuration, but also the levels of the $3d^34s$, $3d^34p$, $3d^34d$ and $3d^24s^2$ excited configurations. With 359 levels in the CC expansion and over 2400 scattering channels for many of the JΠ partial waves, this represents the largest electron-ion scattering calculation to date and it was performed on massively parallel computers using a recently developed set of relativistic parallel *R*-matrix programs.

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