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Electron Impact Excitation Collision Strengths of Transitions in Fe XII[1] SWARAJ TAYAL, Clark Atlanta University — Electron impact excitation collision strengths for transitions between the fine-structure levels of the ground $3s^2 3p^3$ and excited $3s3p^4$, $3s^2 3p^2 3d$, $3s^2 3p^3 3d$, and $3p^5$ configurations in Fe XII have been calculated using the B-spline Breit-Pauli R-matrix method. The multiconfiguration Hartree-Fock method with term-dependent non-orthogonal orbitals is employed for an accurate representation of the target wave functions. There is strong configuration-interaction mixing among different even parity states of the $3s3p^4$ and $3s^2 3p^2 3d$ configurations. The spin-orbit interaction for the levels of the $3s^2 3p^2(^1D)3d\ ^2F$ and $3s^2 3p^2(^3P)3d\ ^2F$ terms is strong. The calculated excitation energies are in excellent agreement with the experimental values. The close-coupling expansion included 90 bound levels of Fe XII, and the relativistic effects have been incorporated through mass, Darwin, and spin-orbit one- body operators in the Breit-Pauli Hamiltonian in the scattering calculation. The present results are compared with available other close-coupling calculations. Overall very good agreement was found for many transitions, but some significant differences were also noted.

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Swaraj Tayal
Clark Atlanta University

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