

## Relativistic K shell decay rates and fluorescence yield for Fe

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### Abstract

In this work, we derive the K-shell fluorescence yield using a Dirac-Fock model. To compute, radiationless and radiative transition rates we have used the MCDF code of Desclaux and Indelicato [1-3]. The wave functions were calculated in the single-configuration approach with magnetic (Gaunt) and first-order retardation terms of the Breit interaction included in the self-consistent variational method. Higher-order Breit retardation terms were added as perturbations. Regarding the QED contributions, the one-electron self-energy is evaluated using the values of Mohr and Kim [4-5] and the self-energy screening is treated with using the Welton method reported by Indelicato [1]. Vacuum polarization is included in the calculations taking the following approach: the Uehling contribution is evaluated to all orders by being included in the self-consistent field while higher order corrections are accounted for as perturbations. The continuum electron wave function in the final state is evaluated by solving the Dirac-Fock equations with the full exchange potential and is normalized to represent one ejected electron per unit energy. The results are compared with available data from other authors.

**Keywords:** K-shell fluorescence yield, radiationless and radiative transition rates, Dirac-Fock calculations