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Radiative transition rates and collision strengths for the n=3,4,5,6,7,8 configurations of Ca II

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This work reports on radiative transition rates and electron impact excitation rate coefficients for levels of the $n = 3, 4, 5, 6, 7, 8$ configuration of Ca II. The radiative data were computed using the Thomas-Fermi-Dirac central potential method in a frozen core approximation and include the polarization interaction between the valence electron and the core using a model potential. This method allows for configuration interactions (CI) and relativistic effects in the Breit-Pauli formalism. Collision strengths in LS-coupling were calculated in the close coupling approximation with the R-matrix method using a dielectric polarization potential for the valence electron and the Ca^{2+} core. Then, fine structure collision strengths were obtained by means of the intermediate-coupling frame transformation (ICFT) method which accounts for spin-orbit coupling effects. The collision strengths were integrated over a Maxwellian distribution of electron energies and the resulting effective collision strengths are given for a wide range of temperatures. We also present an extensive comparison for the polarization contribution to the radiative transition and electron impact excitation rates coefficients, which can lead to contributions of up to 20% in some cases with respect to the "unpolarize" frozen core model.