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RELATIVISTIC CALCULATIONS OF ENERGY LEVEL, LIFETIMES, TRANSITION PARAMETERS, AND ELECTRON IMPACT EXCITATION CROSS SECTION FOR Xe^{36+}

Nitish Ghosh [1] , **Lalita Sharma** [1]

[1]*(Nitish Ghosh) Indian institute of technology Roorkee, Roorkee-247667*

Atomic structure parameters for inert gas ions are in great demand due to their applications in fusion plasma modeling and diagnostics. In fusion devices, various charge states of inert gases ions can exist. Thus, it is of prime importance to have their reliable atomic data to assist in various ongoing projects on the design and development of fusion reactors. From the literature we found that there are very limited experimental or theoretical works available for atomic parameters of Xe^{36+}. In this connection, we calculated energies, lifetimes, transition rates of the lowest 128 levels of Xe^{36+} using multi-configuration Dirac-Hartree-Fock (MCDHF) method and many body perturbation theory (MBPT). The levels considered arise from $3s^23p^6$, $3s^23p^53d$, $3s3p^63d$, and $3s^23p^43d^2$ configurations. The MCDHF results are obtained using the GRASP2018 [1] code, whereas flexible atomic code (FAC) [2] is employed to compute MBPT results. Breit interaction and quantum electrodynamics (QED) effects which are important for highly charged ions, are also accounted for in the present computations. Furthermore, using the relativistic distorted wave theory as described in reference [3], we have calculated electron impact excitation cross section of all transitions to upper levels from the ground and metastable levels for the incident electron energies up to 10 keV. We also provided analytical fittings of these cross sections for their applications in plasma modeling.

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