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# Dielectronic recombination study of Xe3+

Dielectronic recombination (DR) is a fundamental process in plasma physics, which involves the resonant capture of a free electron by an ion and the subsequent emission of photons or other particles. DR is important in the study of astronomical plasmas, such as those found in stars and the interstellar medium [1]. The study of DR can provide insight into the composition and physical conditions of these plasmas. The detection of singly charged strontium in a kilonova event has specifically pointed to the need for more detailed studies on the recombination of low-charged ions [2], as this process can significantly impact the ionization state of the plasma and ultimately the composition of the elements that are produced. In order to better understand how such ions behave in extreme astrophysical environments, the study of recombination in heavy ions is an essential field of study.

The presence of Xe3+ ions in the universe has been detected in certain astronomical environments such as in the atmospheres of white dwarf stars [3], and in planetary nebulae, where it is thought to be produced through the ionization of neutral xenon by ultraviolet radiation from hot stars.

Theoretically and computationally demanding calculations are required for such multielectron systems. In this study, we have made theoretical calculations of cross sections and rate coefficients for various DR channels by using the flexible atomic code (FAC) [4]. The results of our calculations are compared with the cryogenic storage ring (CSR) experiment [5] of our institute and are in good agreement with the experimental data. Xe3+ ion is also very significant because it is one of the highest mass-to-charge ratio ions that is experimentally and theoretically studied simultaneously in this present work.

*References*

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