

Charge Transfer Between S^{2+} and H_2 at Electron Volt Energies

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Sulphur is one of the abundant heavier elements produced through stellar nucleosynthesis. The emission lines from various ionization stages have been observed and used for plasma diagnostics and modeling. However, the ability to use the line ratio to determine the plasma temperature is predicated on the thermodynamic equilibrium condition of the plasma. Because of the low particle density of astrophysical plasmas, thermodynamic equilibrium may not exist and the intensity of the emission lines can be affected by a wide range of collisional processes in the region. In an environment where large fractions of neutral He and/or hydrogen are present, charge transfer can play a key role in altering the intensities of these emission lines. However, there is virtually no data on the charge transfer reaction of S^{q+} and neutrals such as He, H and H_2 . In this paper, we report the result of our first measurement of the charge transfer rate coefficient of S^{2+} and H_2 . No theoretical value is available for comparison.

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