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Rate Coefficients of Singly Ionized Triatomic Hydrogen Using An RF Ion Trap NICK POPE, SAM RONALD, EMILY MOUNT, ADRIAN DAW, ANTHONY CALAMAI — In order to better understand the interactions and composition of the universe, it is essential to know reaction rates between ions, neutral species, electrons, and photons. A significant reaction of interest is H2 + H2+ $\rightarrow$ H3+ + H, a fundamental reaction that produces some of the most abundant ions in the interstellar medium and other areas of the universe. Due to its instrumental role in forming many different polyatomic molecules, rate coefficients for singly ionized triatomic hydrogen are needed in order to accurately model its interactions in the interstellar medium. Singly ionized triatomic hydrogen is studied using a quadrupole radio frequency ion trap coupled with a time of flight mass spectrometer. Singly ionized diatomic hydrogen is created by electron bombardment with diatomic hydrogen. H2+ and H3+ are then studied by ejecting the ions into an active-film electron multiplier. By variation of experimental parameters, systematic uncertainties are addressed and rate coefficients for the H2+ + H2 $\rightarrow$ H3+ + H at electron-volt energies are determined.

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