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Title: SOLAR PHOTOIONIZATION AS A LOSS MECHANISM OF NEUTRAL INTERSTELLAR HYDROGEN IN INTERPLANETARY SPACE

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Abstract: Two primary loss mechanisms of interstellar neutral hydrogen in interplanetary space are resonance charge exchange ionization with solar wind protons and photoionization by solar EUV radiation. The Later process has often been neglected since the average photoionization rate has been estimated to be as much as 5 to 10 times smaller than the charge exchange rate. These factors are based on ionization rates from early measurements of solar EUV and solar wind fluxes. Using revised solar EUV and solar wind fluxes measured near the ecliptic plane we have reinvestigated the ionization rates of interplanetary hydrogen. The result of our analysis indicates that indeed the photoionization rate during solar minimum can be smaller than charge exchange by a factor of 5; however, during solar maximum conditions when solar EUV fluxes are high, and solar wind fluxes are low, photoionization can be over 60% of the charge exchange rate at Earth orbit. To obtain an accurate estimate of the importance of photoionization relative to charge exchange, we have included photoionization from both the ground and metastable states of hydrogen, We find, however, that the photoionization from the metastable state does not contribute significantly to the overall photoionization rate.

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