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2D PIC Modeling of the EUV Induced Hydrogen Plasma and Comparison to the Observed Carbon Etching Rate

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The interaction between an EUV driven hydrogen plasma and a carbon covered surface was investigated using 2D PIC modeling and results were compared with experimental observations. The plasma is formed due to ionization of a low pressure hydrogen gas by the EUV photons and the photoelectrons from the surface. This results in ion fluxes to the surface, leading to the surface etching. We model the evolution of the plasma during and after the EUV pulse and obtain the energy resolved ion fluxes from the plasma to the surface. The carbon etching rates observed at various experimental conditions and estimated from computed ion fluxes for the same conditions agree under assumption that the etching yield is close to one carbon atom per incoming hydrogen ion.

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