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**Study of elementary processes of plasma-wall interaction in fusion devices by means of an inductively coupled hydrogen plasma in interaction with graphite surfaces**

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In controlled fusion devices, the interaction of hydrogen plasma with graphite like walls leads to carbon erosion and hydrocarbon redeposition. When using tritium, which is a radioactive element, hydrocarbon redeposition in the reactor becomes a real safety issue. Therefore carbon erosion must be understood and limited. Our aim is to better understand fundamental mechanisms of hydrogen interaction with graphite. In this aim, we use an ultra-high vacuum set-up equipped with hydrogen guns (atomic and ionic species), with a versatile ICP source working as a plasma source or as an atomic source, and with two mains surface diagnostics: High Resolution Electron Energy Loss Spectroscopy and Scanning Tunneling Microscopy. We will present a model for H adsorption process on graphite surface, and particularly will compare “hot” and “cold” H atom adsorption. We will deal with H(D) abstraction by D(H) atoms. Finally, we will examine ion interaction with graphite both in beams and in plasmas in order to better understand ion-neutral synergetic effects.