

# Surface Analysis Techniques for the Study of Plasma Wall Interactions

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## Abstract

*In experiments with magnetically confined hydrogen plasmas, such as investigated in controlled thermonuclear fusion research, hydrogen isotope, ions and energetic neutral atoms, at energies ranging from a few eV to keV are continually bombarding the first wall materials of the vacuum vessel.*

*The assessment of the implantation as well as the erosion and re-deposition of the sputtered wall material including the evaluation of its hydrogen content is of paramount importance. In this regard, the basic principles of the main surface analysis techniques used under Fusion Technology such as RBS, ERDA, PIXE/PIGE, SIMS, and XPS, will be presented, as well as some non-destructive nuclear reaction methods, which are providing valuable information about the thickness of the analysed layer and its hydrogen concentration (depth profiles) in the near-surface region of the analysed materials.*