

Abstract Submitted
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ARRIBA: A novel in-situ plasma surface interaction diagnostic for magnetic fusion devices SOREN HARRISON, DENNIS WHYTE, University of Wisconsin, Madison — The development and design of a novel plasma surface interactions diagnostic for fusion experiments is described. The Alpha Radioisotope Remote Ion Beam Analysis (ARRIBA) diagnostic is designed to provide in-situ, time and depth-resolved measurement of element concentrations and H/D/T fuel retention at any surface inside a magnetic fusion device, including those surfaces exposed to significant heat loads such as found in the divertor. simple JxB activated mechanical system retracts and flips a cylindrical material sample ($f \sim 10\text{mm}$) during a plasma discharge, such that one end of the cylinder becomes exposed to the plasma. The opposite end is protected from plasma exposure by the tile and is mechanically positioned for surface analysis. Surface analysis is accomplished using non-destructive ion beam analysis (IBA) techniques: Rutherford backscattering (RBS), Nuclear Reaction Analysis and Elastic Recoil Detection (ERD). We will describe initial laboratory tests of an ARRIBA prototype and issues of radiological safety, engineering design, and diagnostic performance. The use of ARRIBA to measure H/D/T retention in ITER is also explored.

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