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ASCII: The Ultra-Low Energy Ion Implantation of Radioisotopes for Surface Characterization at ISOLDE-CERN

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Over the past four decades, the Apparatus for Surface Physics and Interfaces at CERN (ASPIC) has been an ultra-high vacuum (UHV $\leq 10^{-8}$ mbar) setup installed in the ISOLDE experimental hall. It was dedicated to the study of metallic surfaces [1], the magnetic behaviour of thin films [2], an interface evolution [3], among other systems, employing radioactive isotopes, and a variety of surface and thin film fabrication and modification techniques [4].

Recently, the installation has been upgraded with the creation of a brand-new UHV chamber known as the ASPIC's Ion Implantation Chamber (ASCII) [5]. Thus, the ASCII chamber's purpose is to implant radioactive ions at various energies, including ultra-low (> 20 eV) values.

This allows for the implantation of several probes, including (^{111m}Cd, ^{204m}Pb) in two-dimensional materials (graphene, MoS_2), (multi)ferroic materials, nanoparticles, and topological insulators [5, 6]. Similar to the initial ASPIC chamber, it is kept at an extremely high vacuum of $\leq 10^{-9}$ mbar. The chamber was successfully tested at the University of Göttingen for implanting ^{111}Ag, including the beam sweep.

Currently, the setup is being finished at ISOLDE to become operational. Once the commissioning finishes, the setup will be available for the wide community of collaborators. In particular, ASCII will play an important role in nuclear-condensed matter physics for the local study of surfaces and interfaces.

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