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The upgraded ASPIC and ASCII setup: expanding experimental capabilities for solid-state physics at ISOLDE

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During the 1980's and 90's, the Apparatus for Surface Physics and Interfaces at CERN (ASPIC) was instrumental to many Perturbed Angular Correlation (PAC) spectroscopy studies at ISOLDE [1]. The setup was dedicated to surface modification and characterization, coupled with precise control of the position of PAC probes, enabling investigations into the position of adatoms on film surfaces or the magnetic influence of ferromagnetic films on the substrate, amongst other things. However, despite efforts to prevent it, the ASPIC has become inactive in the last decade. Since 2019, the setup has been moved to Göttingen, Germany, where it is currently being refurbished.

In this talk, we present the upgraded ASPIC setup, its capabilities, and present its brand-new companion chamber: the ASPIC's ion implantation chamber (ASCII). This chamber allows deceleration of the 30 –60 keV radioactive isotope beams, down to 10 –50 eV. Use of ultra-low energy implantation in lieu of the old annealing-based catcher system will result in a faster, easier and more efficient control of probe incorporation into the samples. Upon installation in the ISOLDE experimental hall, the two linked chambers will significantly increase the possibilities of conducting solid-state physics experiments, including (but not limited to) PAC and Mössbauer studies on 2D and multiferroic materials [2,3].

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[2] K. Potzger, T. E. Mølholt, A. S. Fenta and L. M. C. Pereira; J. Phys. G: Nucl. Part. Phys. 44 (2017) 064001; *Surface science using radioactive ions at ISOLDE: from metal surfaces to two dimensional materials*
[3] J. Schell, H. Hofsaess, H.D.C. Lupascu, Nucl. Instr. Meth B 463 (2020) 134 ; *Using radioactive beams to unravel local phenomena in ferroic and multiferroic materials*

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