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SEASON: a powerful decay-station for the study of (super)-heavy nuclei

SEASON (Spectroscopy of Electron and Alpha in Silicon bOx couNter) is a decay station developed at CEA-IRFU and currently being commissioned. SEASON is designed to meet the constraints of a high energy-resolution decay station and an efficient counter for laser spectroscopy for the study of heavy and superheavy nuclei. The detection system is made of 7 DSSD (Double-sided Silicon Stripped Detector) for the detection of alpha particles and electrons, and will be coupled with 2 HPGe (High Purity Germanium) detectors for the gamma-rays. The low energy beam (< 30 keV) of nuclei under study will be implanted in very thin (90 nm) carbon foils, evenly distributed on a rotating wheel. This will allow for a detailed decay spectroscopy, the summing effect being reduced thanks to the stripping of the detector, but also to remove the accumulated radioactivity by rotating the wheel to start a contamination-free measurement.

The offline (source) commissioning is taking place from February to May 2025 at GANIL and the online (beam) commissioning is planned at IGISOL (Jyväskylä –Finland) in the Fall of 2025. An experimental campaign is then foreseen up to the end of the year 2026, when SEASON will come back to France at GANIL to be set up at the end of S3-LEB (Low Energy Branch of S3).

In this poster, after having recalled the physics cases that we want to study with SEASON, we will present the SEASON detector. Then the results of the offline commissioning will be shown, with a focus on SEASON's characteristics such as resolution, efficiency, ... A comparison to GEANT4 simulation will be added. Finally, the upcoming schedule and opportunities with SEASON will be presented.

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