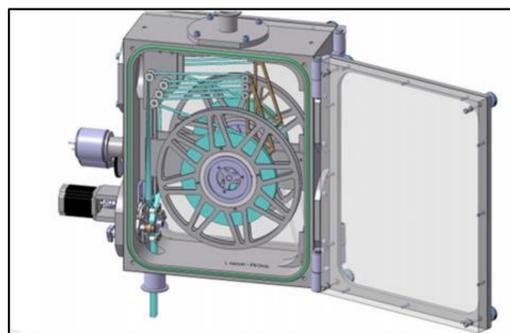


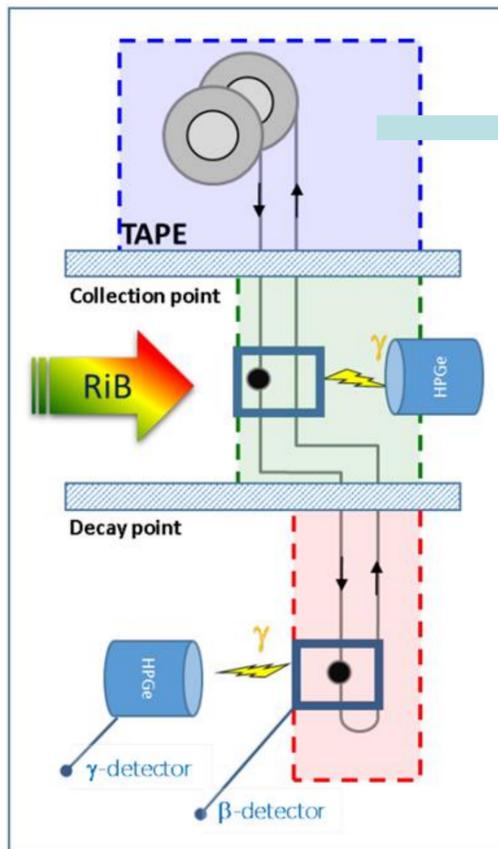
M. Montis, M. Giacchini, T. Marchi, *INFN-LNL, Legnaro, Italy*
 B. Genolini, L. Vatrinet, D. Verney, *IPN, Orsay, France*
 J. Abraham, *iThemba LABS, Somerset West, South Africa*

The SPES Tape Station (STS) for Radioactive Ion Beams (RIBs) characterization is under construction at LNL. This tool will be used to measure the actual composition of the radioactive ion beams extracted from the SPES- β ion source and to optimize the source's parameters. STS will provide beam diagnostic information by determining the beam composition and intensity. At the same time, it will be able to measure the target release curves needed for the source's characterization and development. The core part of the system, the related motor and controls are being designed and constructed in synergy with IPN Orsay (France), iThemba Laboratories (South Africa) and the Gamma collaboration (INFN-CSN3).

The SPES Tape Station

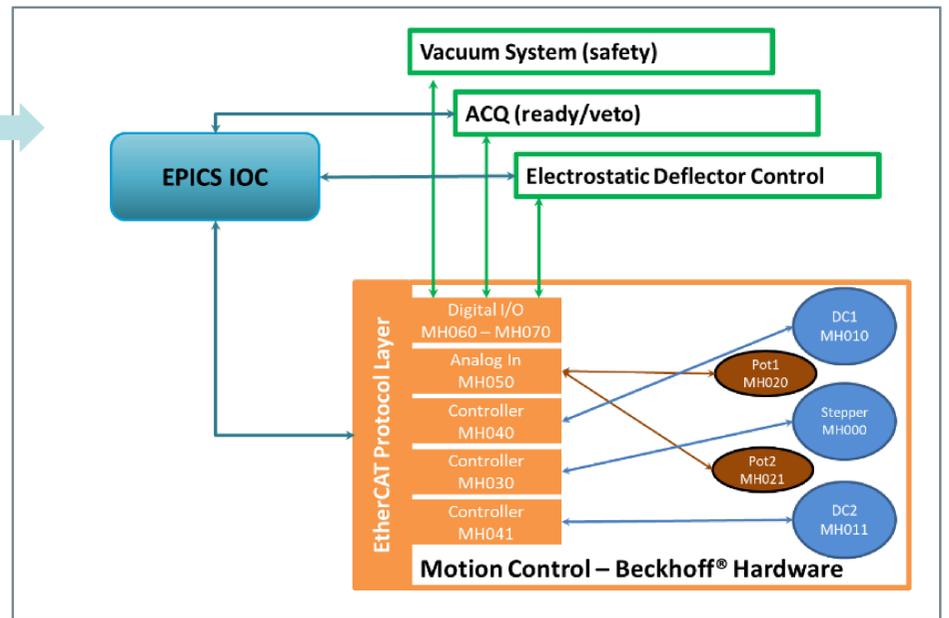


The STS uses particular techniques mainly based on γ -ray spectroscopy of the β -decaying radioactive nuclei. The ions are implanted on an aluminated mylar moving tape and either measured in-situ or transported to a shielded decay location. The detection of single γ -ray spectra or β - γ coincidence spectra provides then the re-quired information. The further movement of the tape allows removing any residual long-lived activity before a new measurement cycle is started. The radioactive ions of interest are produced, extracted, ionized and pre-selected at the SPES target location.



The box contains two disks which host the mylar tape and allow to roll it in either direction, just like a movie tape. To do so, three motors and a feedback system are employed. One stepper motor defines the velocity and rotation direction of the tape, while two DC motors controlled by the feedback system roll the tape around the disks, keeping the proper tension. In addition to the cassette, the main components of the tape station system are

STS Control System



Sub-System	Hardware interface	Software interface	Protocol
Vacuum	Beckhoff® hardware: Digital Signal (DI) for safety		
Acquisition	Beckhoff® hardware: Digital Signals (DI/DO)	EPICS framework	EtherCAT
Electrostatic Deflector	Beckhoff® hardware: Digital Signals (DI/DO)	EPICS framework	EtherCAT

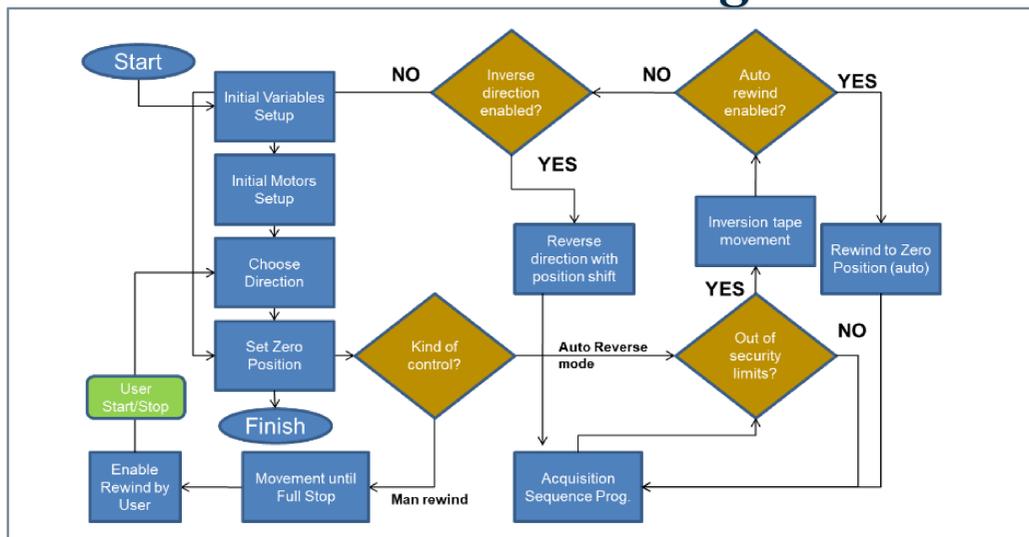
Test Bench and Test Performed



The solution designed for the motor control is based on EtherCAT bus: the EPICS layer has been built from Etherlab device driver and Diamond Light EPICS EtherCAT master support. The test bench is a single EtherCAT slave I/O system populated with all

the modules required to communicate to the EtherCAT master, control the stepper motor and the two DC motors and read the potentiometers' position used to verify the tape tension.

STS Low-Level Logic



First Results and Conclusion

The tape station is the first diagnostic system completely designed and realized from the scratch in EPICS for the entire SPES project. One of the most challenging point is the substitution of the actual hardware in use on a similar apparatus with a brand new one and, as consequence, providing the software required to control it. Results coming from the tests performed are promising, which let us achieve the project requirements. The great collaboration among the Laboratories involved in this project has given the boost required to reach the preliminary goals in a very short time, and the actual results can confirm it

