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## The Scattering Experiment Chamber of HIE –ISOLDE and the study of di-neutron correlations via 2n-transfer reactions in of $^{11}\text{Li}$ and $^{13}\text{Be}$

*Tuesday, 21 April 2026 11:00 (20 minutes)*

The XT03 beamline at HIE ISOLDE provides a versatile station for reaction studies, centred on the SEC chamber, which has hosted numerous experiments during its first decade of operation. Halo nuclei such as  $^{11}\text{Li}$  and  $^{14}\text{Be}$  offer a unique opportunity to investigate di neutron correlations and the evolution of shell structure in light neutron rich systems.

The ground state of  $^{11}\text{Li}$  contains mixed p, s, and d components, and its low energy continuum shows broad dipole type strength together with narrower resonances at higher excitation energies. However, the lowest resonance near 1 MeV remains poorly constrained. Studies of the  $N = 7-8$  isotonic chains reveal significant shifts of the neutron orbitals, leading to the  $1/2^+/1/2^-$  inversion in  $^{11}\text{Be}$  and the breakdown of the  $N = 8$  magic number in  $^{12}\text{Be}$ , highlighting the need for reliable information on the unbound nucleus  $^{13}\text{Be}$ .

Transfer reactions with radioactive beams in inverse kinematics provide a sensitive probe of these structures. Two neutron transfer from  $^9\text{Li}$  is predicted to populate selectively the ground and low lying excited states of  $^{11}\text{Li}$ . At ISOLDE, we investigate (t,p) reactions on  $^9\text{Li}$  and  $^{11}\text{Be}$  at 7 MeV/u and 5.4 MeV/u to study the low energy excitations of  $^{11}\text{Li}$  and the resonant states of  $^{13}\text{Be}$ . This contribution presents the SEC setup and the first results from these measurements.

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**Session Classification:** Opportunities in reaction studies with re-accelerated rare isotope beams at ARIEL