

**TITLE:**

**The  $(d, p)$  reaction on  $^{12}\text{Be}$  g.s. and isomer: Bringing clarity to the structure of  $^{13}\text{Be}$**

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### SUMMARY OF THE PROPOSAL

The knowledge on the spin-parity and single-particle structure of  $^{13}\text{Be}$  low-lying states is ambiguous and limited. A  $0_2^+$  core-excited component may play an important role in the structure of these states. To determine the contribution of this component, and better determine the evolution of the  $s_{1/2}$ ,  $p_{1/2}$  and  $d_{5/2}$  single-particle energies, we propose to study the structure of the low-lying states of  $^{13}\text{Be}$  using a  $(d, p)$  reaction on a  $^{12}\text{Be}$  beam containing both its ground and isomeric states.

The backwards-emitted protons will be measured using the active target time projection chamber (AT-TPC) from NSCL, Michigan State University, which provides a large effective target thickness with the best possible angular coverage. The experiment will be performed at the RCNP exotic nuclei (EN) beam line. We request 7 days of beam time to measure the  $^{12}\text{Be}(d, p)^{13}\text{Be}$  reaction at 18 MeV/u. The  $^{12}\text{Be}$  beam with an isomer component will be produced at an estimated intensity of  $5 \times 10^3$  ions per second via the projectile fragmentation of a  $^{18}\text{O}$  primary beam at 60 MeV/u incident energy on a Be target. The projectile-like Be ions will be measured using a zero-degree telescope placed downstream of the AT-TPC.