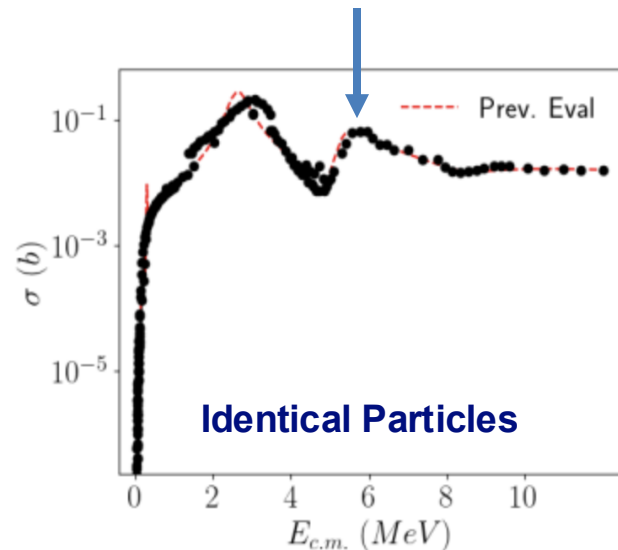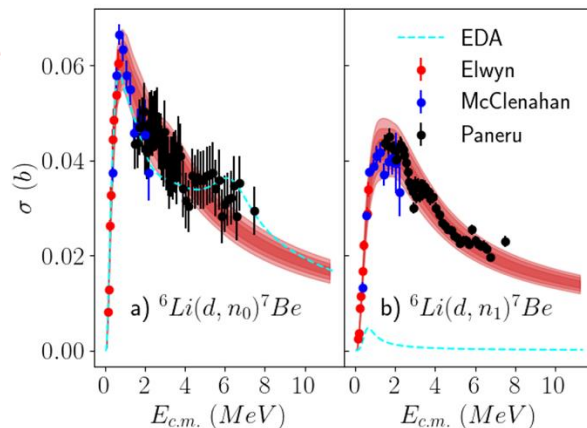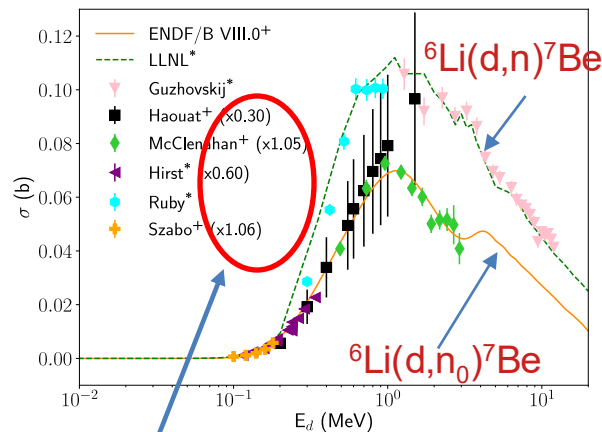# *R*-matrix Analysis of ^{8}Be System

Som Nath Paneru, LANL

CSEWG Meeting 2025, LA-UR-25-30634

- For the case of ^{8}Be compound system, the existing ENDF evaluation only includes reactions channels resulting in the ground state of residual nucleus such as ^{6}Li(d,n$_0$)^{7}Be, ^{6}Li(d,p$_0$)^{7}Li thereby excluding the reactions resulting the residual nucleus in excited state such as ^{6}Li(d,n$_1$)^{7}Be, ^{6}Li(d,p$_1$)^{7}Li, etc.
- Incompleteness shown in recent publications by S. N. Paneru *et al* (Phys. Rev. C 110, 044603 (2024) and Phys ReV C 111, 064609 (2025))
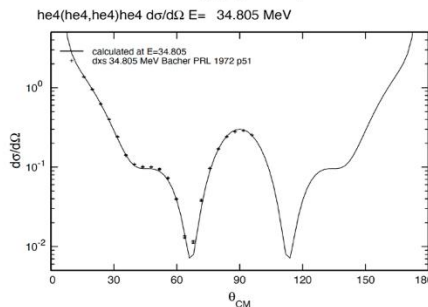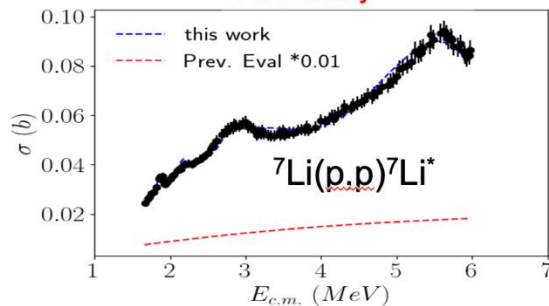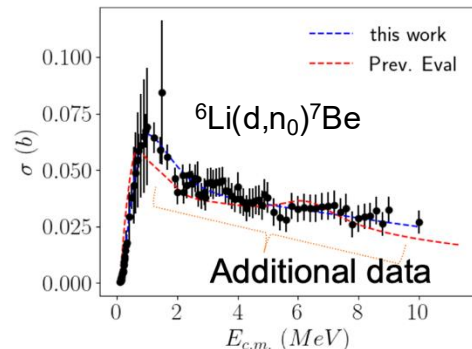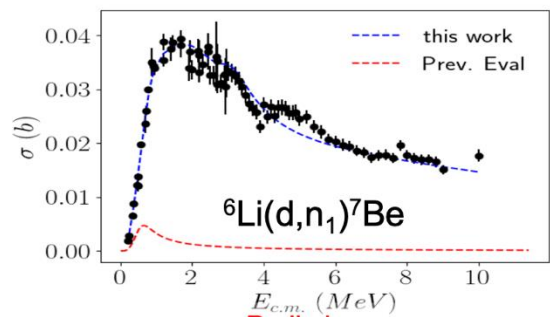
- ➤ Inconsistencies were observed for the reaction channels with identical particles in exit channels such as for ^{7}Li(p,α)α, ^{6}Li(d,α)α.
- ➤ Leading to non-physical structures in the evaluation.

- ➤ Incorrect assignment of the partial cross sections and the total cross sections lead to the non-physical normalization factors.

Ongoing Work: new evaluation at LANL

- Added data to reactions resulting the residual nucleus in excited state such as $^6Li(d,n_1)^7Be$, $^6Li(d,p_1)^7Li$, etc.
- Included additional data at high energies for various reaction channels with proper treatment of the systematic uncertainties

- Finish the evaluation within next ~3 months
- Goal: Submit the new evaluation for ENDF/B-IX.
- Consistency checks between the *R*-matrix codes:
  - Check consistency of results from this work to the results from AZURE2 analysis.