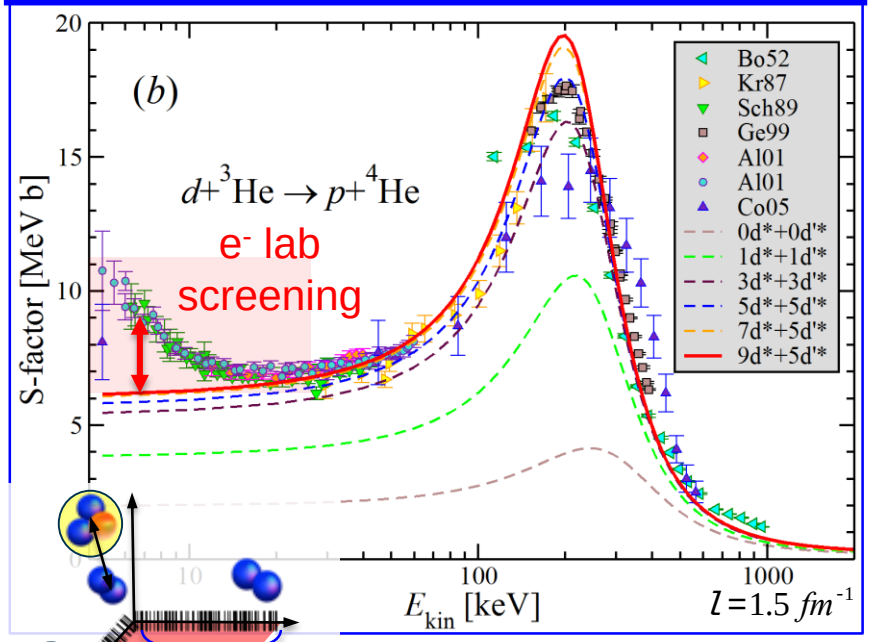
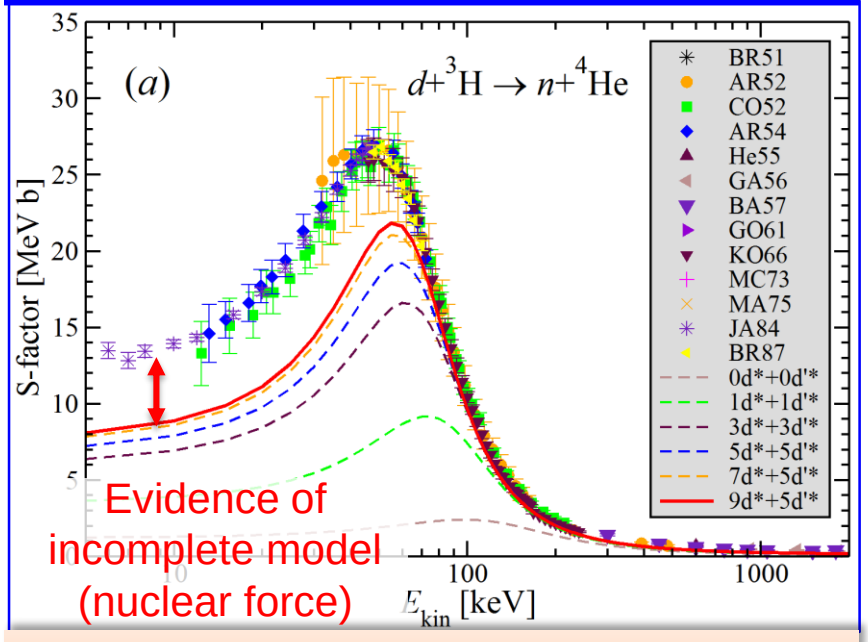
FIRST STEPS TOWARDS *AB INITIO* CALCULATIONS OF FUSION WITH NCSM/RGM

P. Navrátil, S. Quaglioni, PRL108 (2012)

^{3}He(d,p)^{4}He astrophysical S-factor



^{3}H(d,n)^{4}He astrophysical S-factor



NCSM/RGM results for the ^{3}He(d,n)^{4}He astrophysical S-factor compared to beam-target measurements.

Calculated S-factors converge with the inclusion of the virtual breakup of the deuterium, obtained by means of excited $^3S_1$-$^3D_1$ (d^*) and $^3D_2$ (d'^*) pseudo-states.

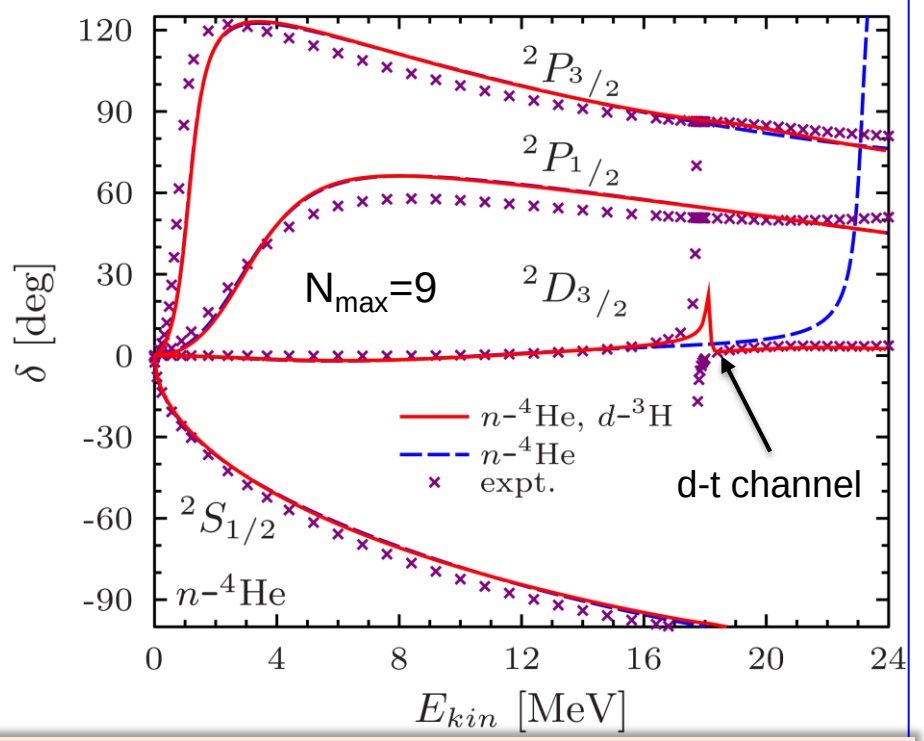
Incomplete nuclear interaction: requires 3N force (SRG-induced + "real")

FIRST STEPS TOWARDS *AB INITIO* CALCULATIONS OF FUSION

G. Hupin, S. Quaglioni, P. Navrátil work in progress

d-t fusion

n-^{4}He phaseshifts with NCSMC and the chiral two- and three-nucleon force



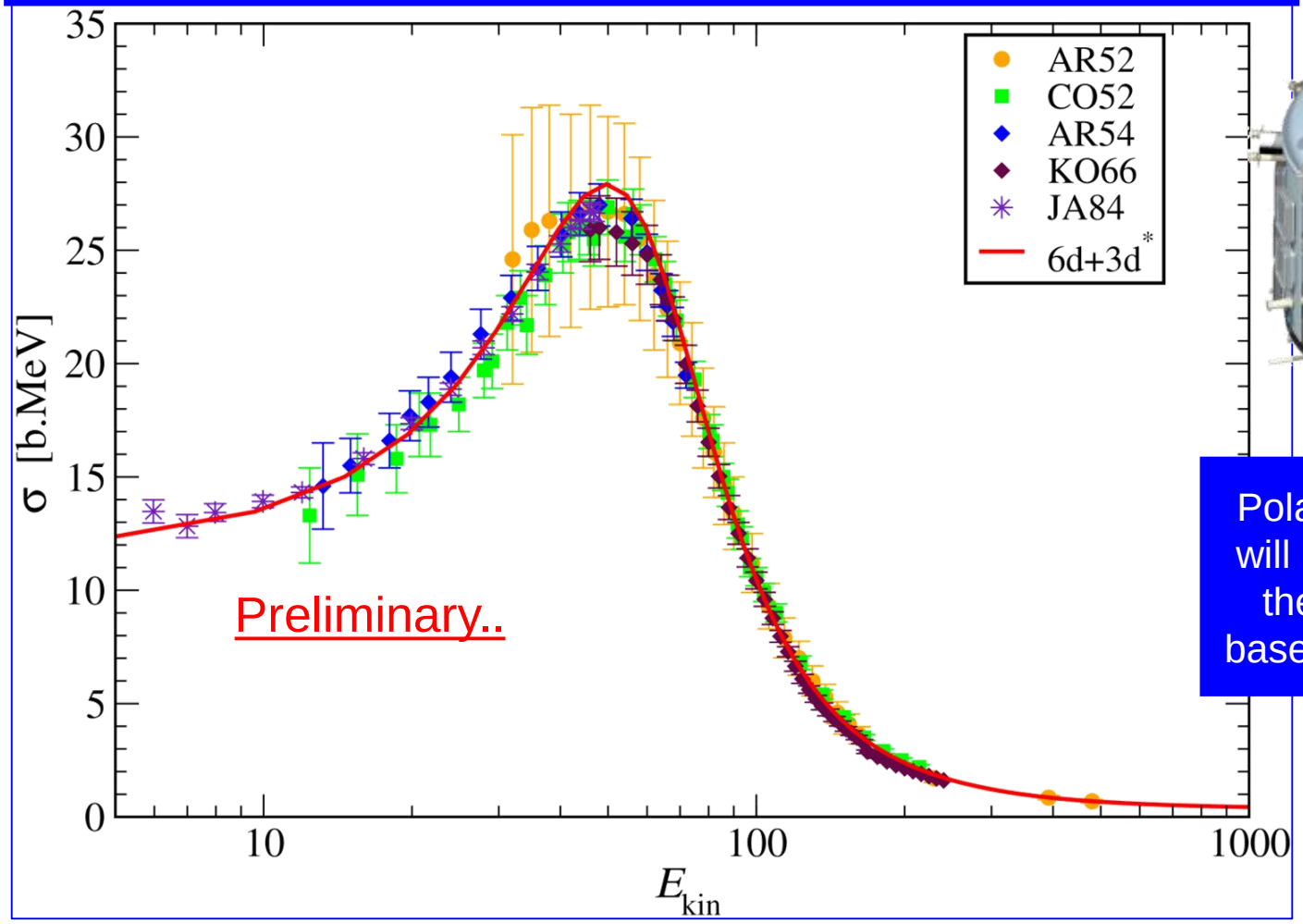
n+^{4}He(g.s.) phase shifts with NN+3N potential, λ=2.0 fm^{-1}, with eigenstates of ^{5}He at N_{max} =9.

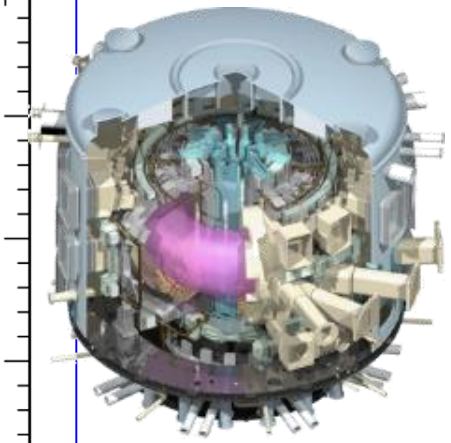
- Perspective to provide accurate t(*d*,*n*)^{4}He fusion cross-section for the effort toward earth-based fusion energy generation.
- The *d*-t fusion is known to be very sensitive to the spin-orbit and isospin part of the nuclear interaction.

FIRST STEPS TOWARDS *AB INITIO* CALCULATIONS OF FUSION

G. Hupin, S. Quaglioni, P. Navrátil work in progress

Ab initio d-t fusion cross-section





Polarized cross-section will be a valued input to the design of energy based fusion technology.