Explain, predict, and use emergent nuclear features in the high-precision physics era

Many progress made:
- development of realistic interactions,
- ab initio calculations,
- unification of nuclear structure and reactions.

Opened door to high-precision physics era:
- Has been concentrated in lighter systems,
- The effort must continue to extend to exotic nuclei,
- And also to heavy nuclei.

To this goal:
- important to concentrate efforts in explaining emergent nuclear features: few-body dynamics, deformation, clustering, continuum-couplings effects …etc.
- Has been shown these effects play an important role across the nuclear chart, and particularly when reaching the drip-lines.
- Origin not well understood: how does deformation & clustering emerge from the elementary particles dynamics? How does continuum couplings and deformation affect reactions close to the drip lines? What part(s) of the nuclear interaction are responsible for deformation? How does this connect to QCD? How they affect structure/reactions; How does symplectic symmetry originate from QCD?

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Direction (summary):

- To explain emergent nuclear features: few-body dynamics, deformation, clustering, continuum-couplings effects …etc.
- Play an important role across the nuclear chart (particularly drip-lines).
- Origin and their effect not well understood, important for going further toward the drip-lines and heavy elements.

To address these questions:

- Emerging phenomena, ab initio reactions for intermediate- to medium-mass nuclei to constrain the nuclear force.
- Study the impact of the different components of the nuclear interaction to understand the origin of emergent few-body dynamics.
- Continue development of ab initio reactions up to medium-mass nuclei with complex projectile through physically relevant and hybrid bases.
- Push further collaborations between different theoretical community.