Nuclear structure for high-energy nuclear collisions

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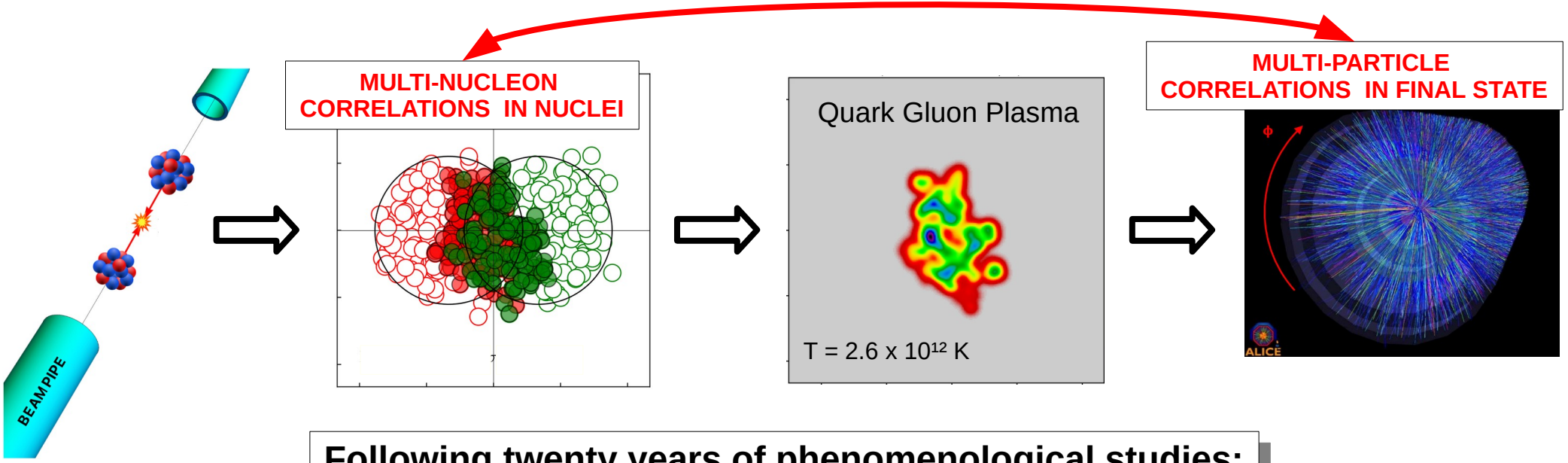
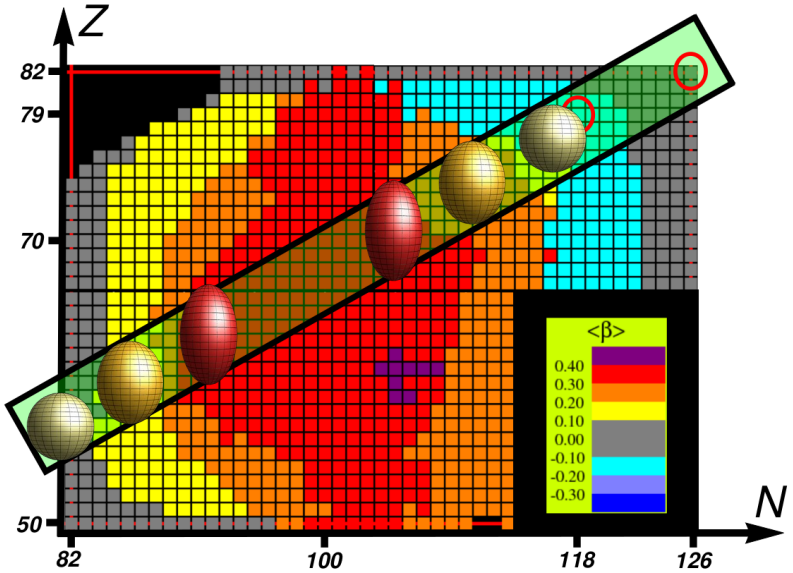


Following twenty years of phenomenological studies:

- Scattering at the level of nucleons + instantaneous interaction. All positions of nucleons are probed. **Input to the collision model is a sampling of the wave function.**
- Collective spatial correlations of nucleons show up clearly at high energy. **We see all deformations/shapes.** Quadrupole, triaxiality, octupole, hexadecapole, and even skin differences between isobars.
- We have developed tools to precisely probe the influence of structural properties of the colliding nuclei. **We assess the consistency of nuclear models/experiments across energy scales.**

Main outcome: Knowledge about stable nuclei fully complementary to low-energy experiments.



POTENTIAL WITH HEAVY NUCLEI

- Precise determination of relative deformations.
- Observation of small triaxial deformations.
- Deformations beyond hexadecapole (β_4).
- …

Current species: ^{238}U, ^{208}Pb, ^{197}Au, ^{129}Xe, ^{96}Ru, ^{96}Zr

EDF people: please provide input!

Collide more before BNL RHIC shut down? (2026)
May not be possible. Still, case worth pursuing.

PROSPECTS FOR LIGHT NUCLEI

– **New tools to test *ab initio* results. (NLEFT, NCSM, …)**

– **Collisions of ^{16}O at BNL RHIC in 2021, at CERN LHC in 2024.**
– We will strongly push for ^{20}Ne+^{20}Ne collisions at CERN LHC before 2030.

***Ab initio* people: please provide input!**

– Potential window for many light species at CERN LHC beyond 2032.
Work together on cases relevant for two communities.