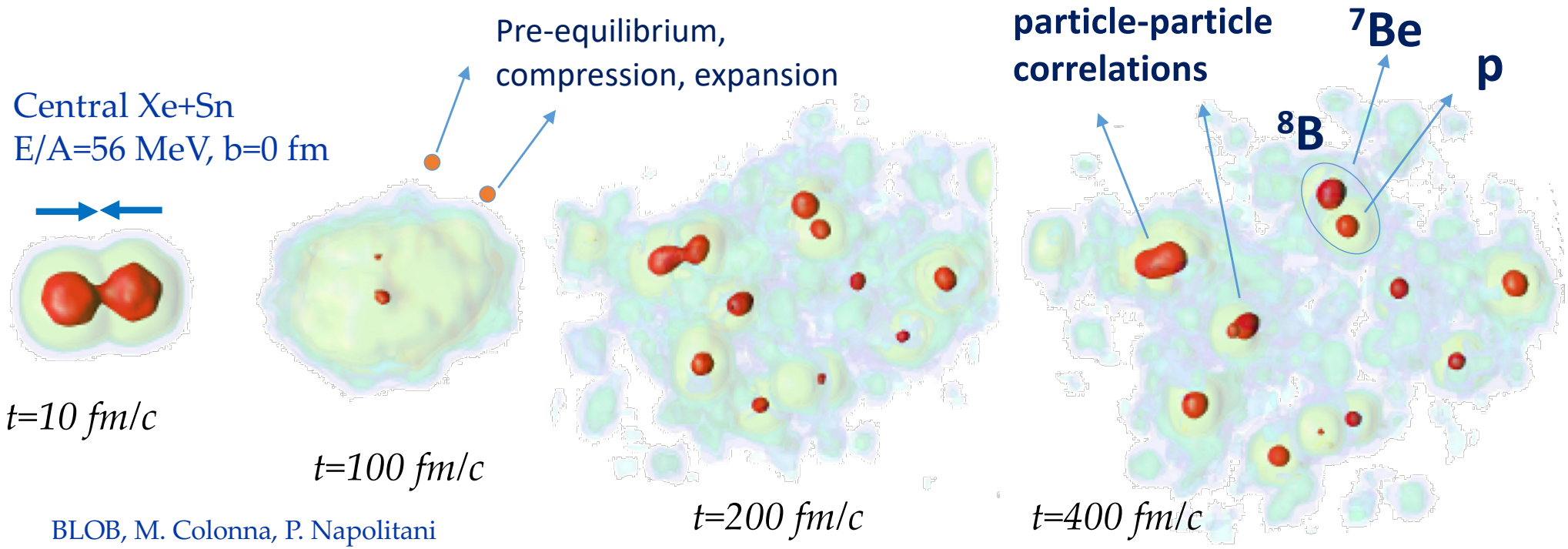
Why this meeting?

- Comité Indra - new task
  - coordination for model comparisons to experimental data collected at the INDRA-FAZIA campaigns @ GANIL
  - explore future opportunities at FAIR-GSI
  - links to astrophysical explorations
  - new strategies
    - i.e. machine learning (also for data analysis)

Terrestrial tool: HIC



BLOB, M. Colonna, P. Napolitani

Collective properties

EoS, **Symmetry Energy**
(Isospin diffusion/drift)

Femtoscopic properties

HBT and **in-medium resonance decays and clustering.**

EoS of asymmetric nuclear matter

$$E(\rho,\delta) = E(\rho,\delta=0) + E_{sym}(\rho)\cdot\delta^2 + O(\delta^4)$$

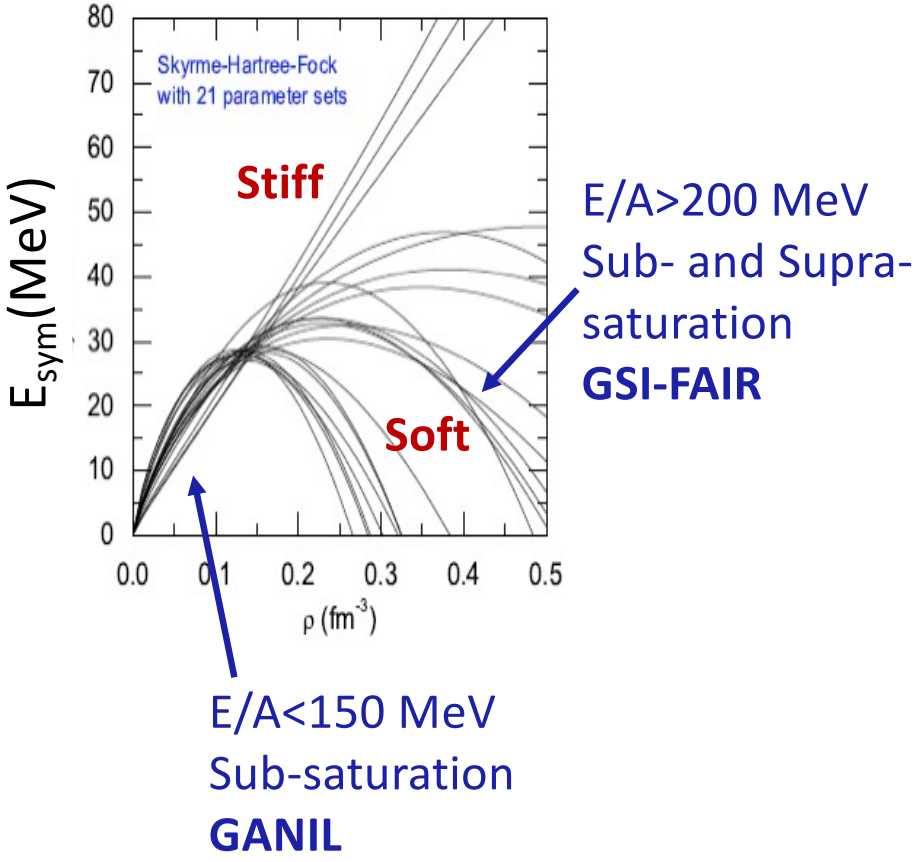
Asymmetry term

$$\delta = \frac{\rho_n - \rho_p}{\rho_n + \rho_p}$$

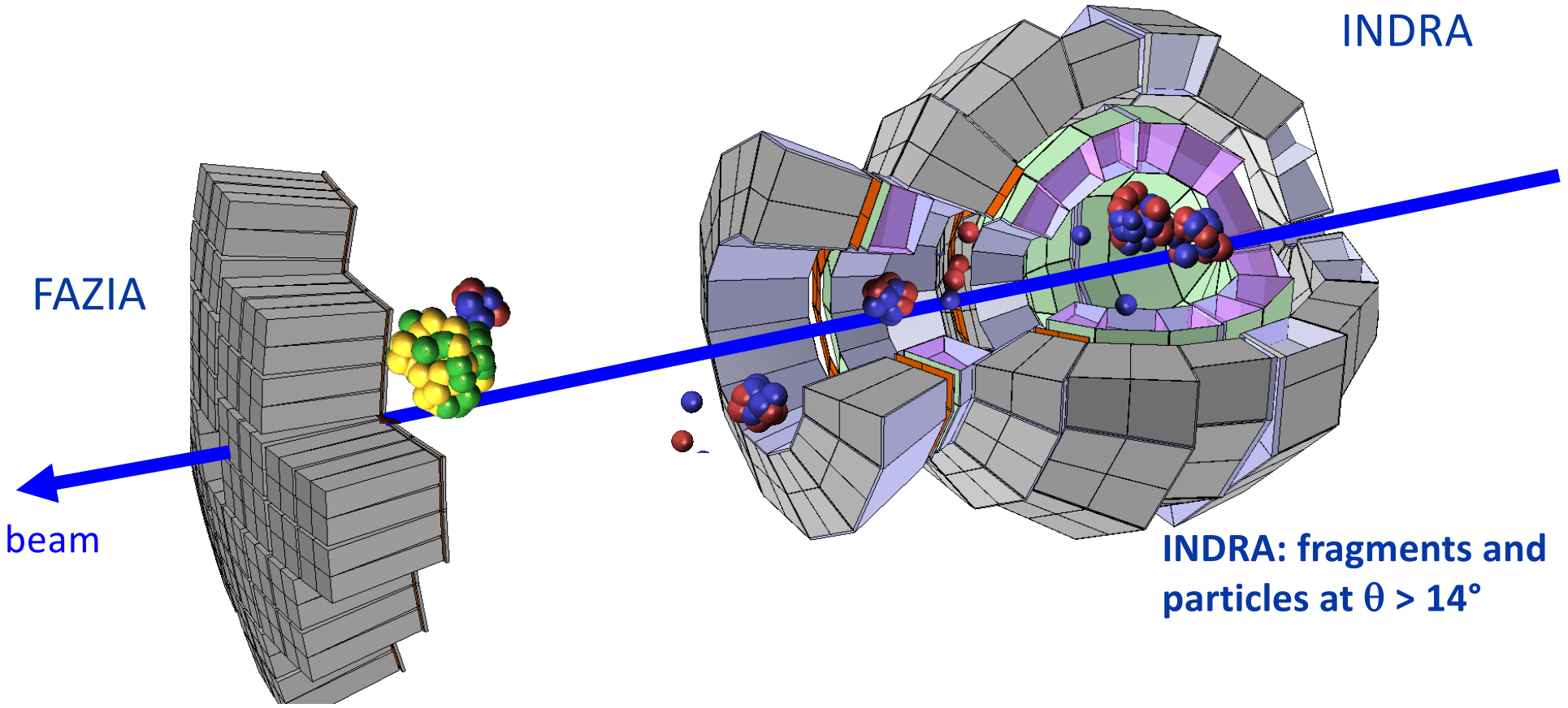
$$\rho = \rho_n + \rho_p$$

1. Study reactions with ranges of N/Z of proj and target
   → large δ^2 to enhance effects of E_{sym}
2. Need detectors with high isotopic resolution (identify isotopes both in Z and N)

B.A. Li et al., Phys. Rep. 464, 113 (2008)



FAZIA-INDRA @ GANIL (2019-2023)



- **12 Blocks (192 telescopes)**
- **full Z & A identification of 1≤Z<25 at θ < 14°**

1st campaign (2019)

^{58,64}Ni+^{58,64}Ni

E/A=32 and 50 MeV

How to probe EoS, E_{sym}, etc.

- Run transport code simulations to try to explain experimental observation
  - better if "reproduce experimental observation", but "explain" already important
- Large number of observables
  - Both for initial state (impact parameter is not directly measured but deduced from obseravbles to be tested, etc.)
  - …and for final state (plenty of data available)
- Models presently available within the collaboration
  - BLOB, AMD, QMD, …

Questions

- Is it important to use BLOB? Why?
  - Yes
- How about the use of machine learning
  - What did we learn from its use?
  - What resources may we count on?
  - How about other models
- Explore the importance of GEANT4 interfaces
  - Not discussed within the INDRA-FAZIA CI, but a good point to be raised