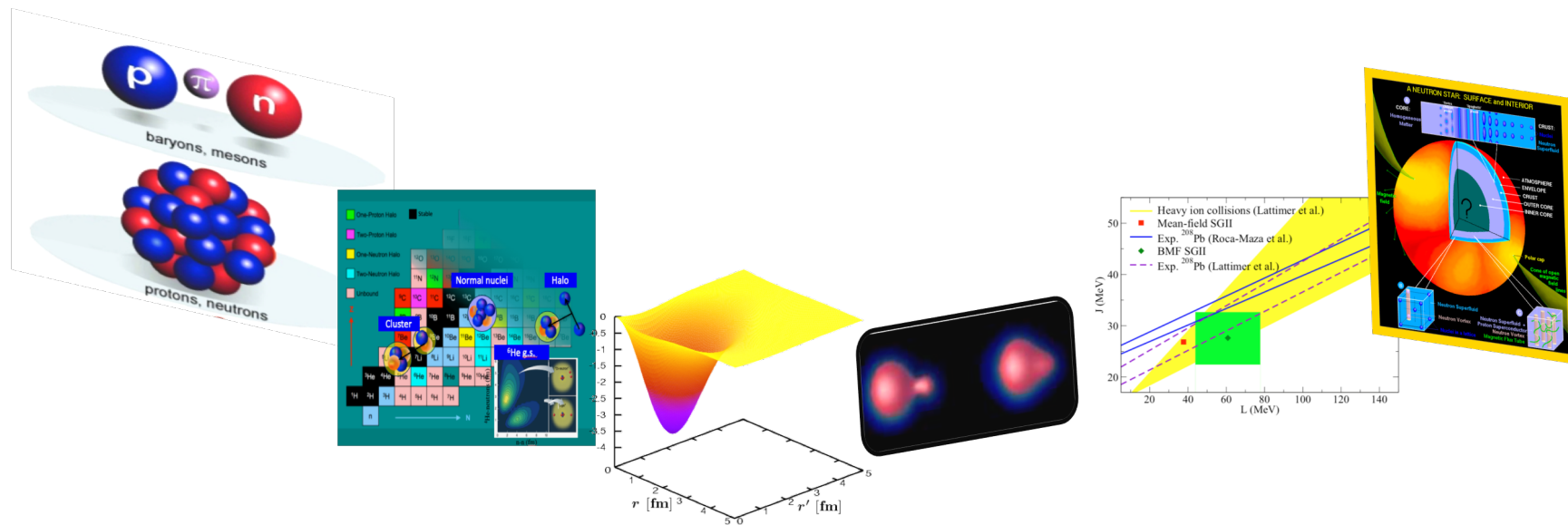


# Nuclear Physics Theory team (Theory Pole)



# Nuclear Physics Theory team

- Permanent (7+2)

Marcella Grasso (DR)

Guillaume Hupin (CR)

Elias Khan (Pr)

Denis Lacroix (DR)

Paolo Napolitani (CR)

Michael Urban (DR)

Bira van Kolck (DR)

+ Jaume Carbonel (DR)

+ 1 CR in Oct 2024

- Phd & Postdocs

ALMIRANTE Giorgio

AYCHET-CLAISSE Samuel

CONTESSI Lorenzo (Pdoc)

DEGHANI Alireza

DUAN Mingya

HEITZ Louis

PALANIAPPAN Viswanathan

YAGHI Osama

ZHANG Jing

# Where are we ?

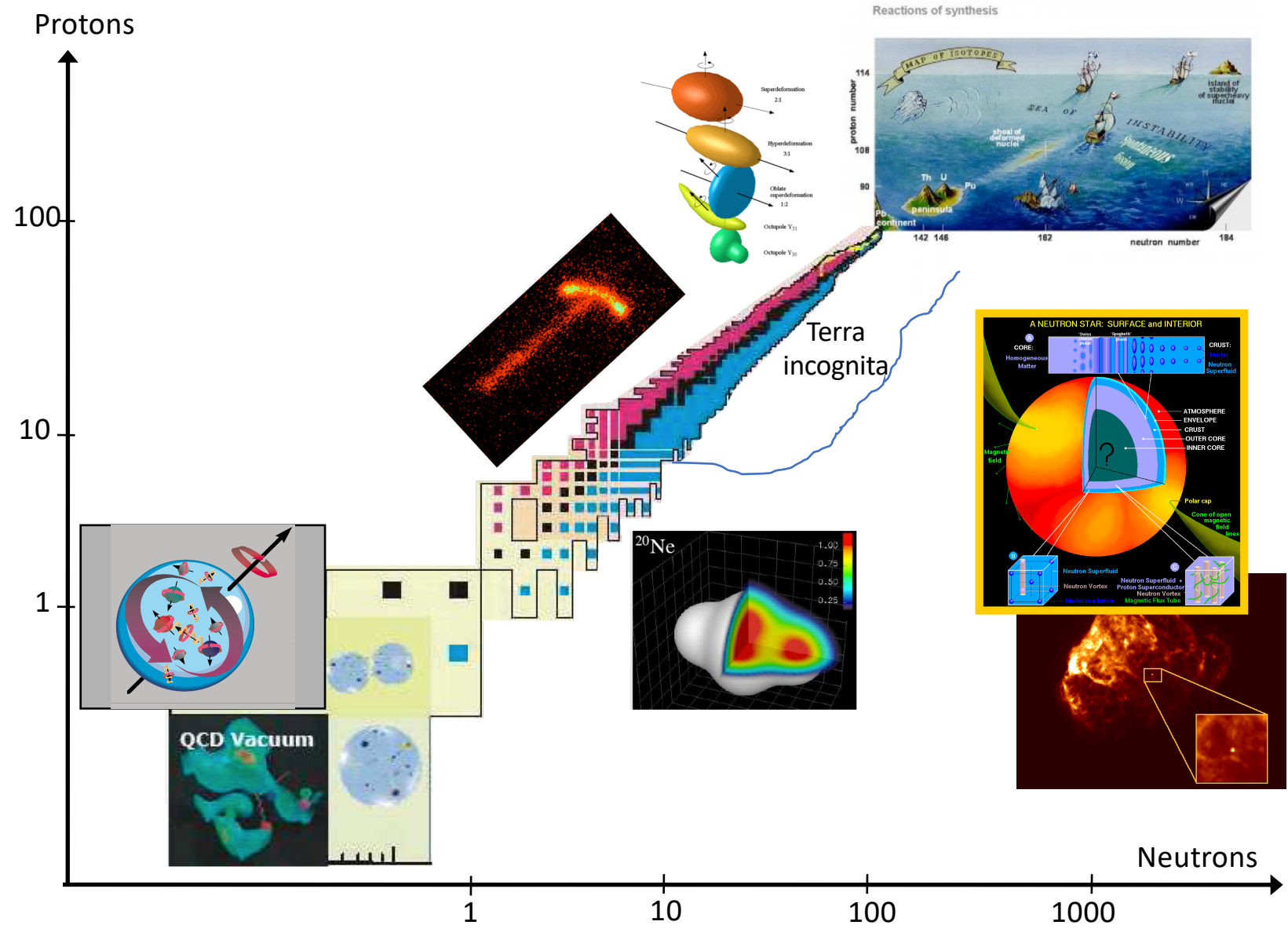


Bat. 100  
2d floor

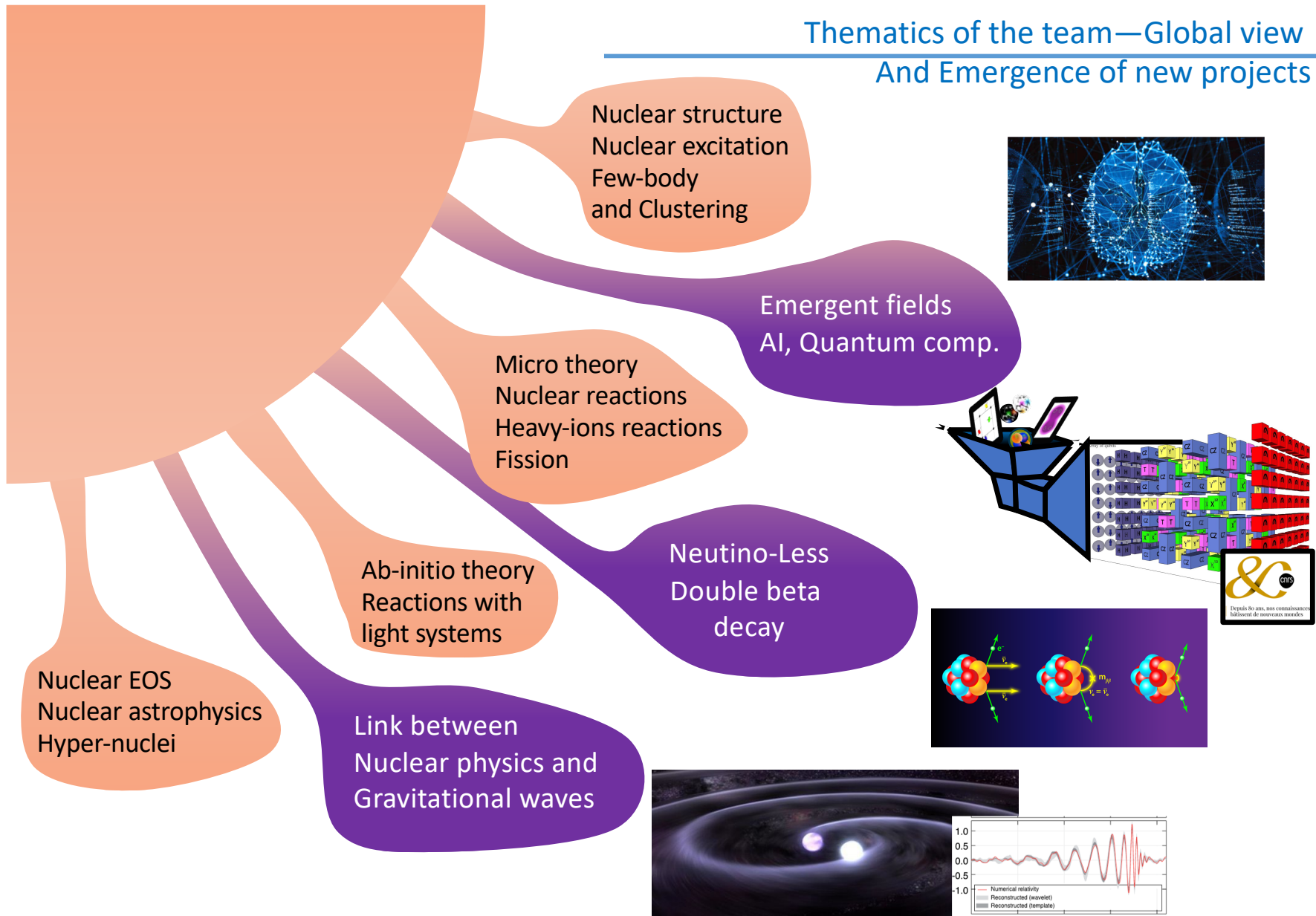


# Topics

- Nuclear structure, Ab initio methods and few-body systems
- Nuclear dynamics: reactions, transport, excitations, decays
- Nuclear astrophysics: neutrons stars, neutrino oscillations
- Interdisciplinary research, application and emerging technologies



# Thematics of the team—Global view And Emergence of new projects



### Nuclear structure, Ab-initio methods and few-body systems

- Nuclear effective field theories: excited baryons in Chiral EFT, matching nuclear EFTs to lattice QCD [Bira]
- antinuclear forces and structure [Bira, Guillaume]
- nuclear forces and currents from EFT, new probes in few-body systems [Bira, Guillaume]
- halo and cluster states with Halo/Cluster EFT, and Cluster phenomenology [Bira, Elias]
- Development of energy density functional model for nuclear structure [Elias, Denis]
- Generator Coordinate Methods and their extensions [Elias, Denis]

### Nuclear dynamics

- towards the modeling of complex reactions with ab-initio methods [Guillaume]
- development of microscopic models for heavy-ion collisions beyond mean field in the low (few MeV per nucleon) to intermediate (200 MeV per nucleon) energy range. Semiclassical approaches (Boltzmann), quantum approaches (TDHF). [Paolo]
- Microscopic quantum transport theories including stochastic methods [Denis]
- Description of low energy nuclear phenomena: collective excitation, fission, ... [Denis, Elias]

### Nuclear astrophysics

- cluster formation in heavy-ion collisions as a function of time and density and links with the nuclear equation of state. [Paolo]
- Application of nuclear models to nuclear astrophysics [Elias]
- Description of neutrons stars [Michael]
- Quantum information in neutrino oscillations [Denis]

### Interdisciplinary research, applications and emerging technologies

- Fermi liquids: dissipation, chaos, large-amplitude fluctuations and bifurcations. [Paolo]
- fast heavy-ion-collisions solution for medical applications through deep-learning [Paolo]
- Superfluidity and strongly interacting Fermi gas [Michael, Denis]
- Machine learning and Quantum Machine Learning [Guillaume, Denis]
- Quantum computing applied to many-body systems [Denis, Guillaume]
- Nuclear tests of global symmetries (lepton number, baryon number, etc)[Bira]
- expansion around unitarity for nucleons and atoms [Bira, Guillaume]