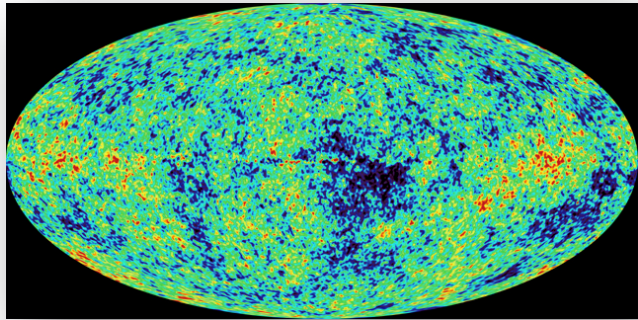
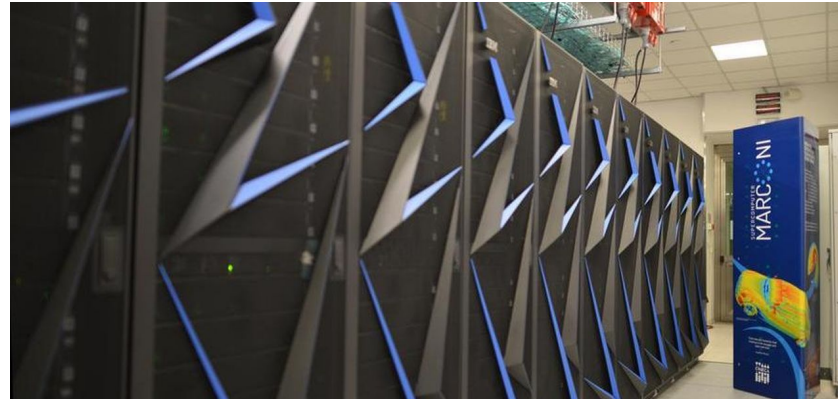


# Cosmological Simulations & High-performance computing – S. Borgani

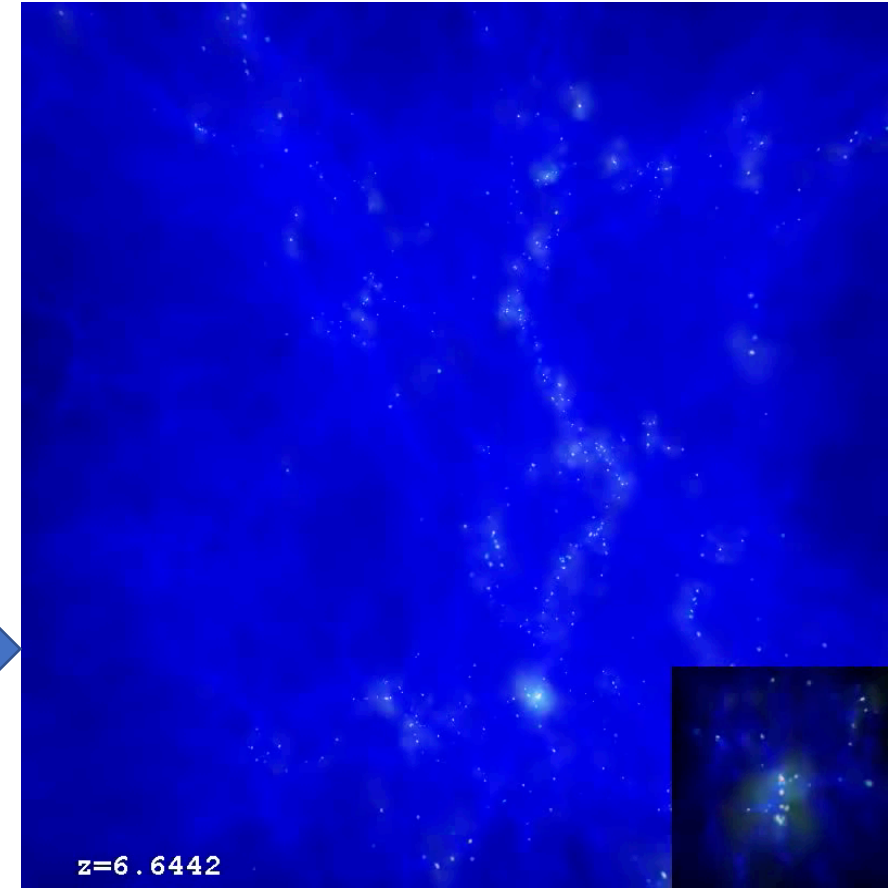


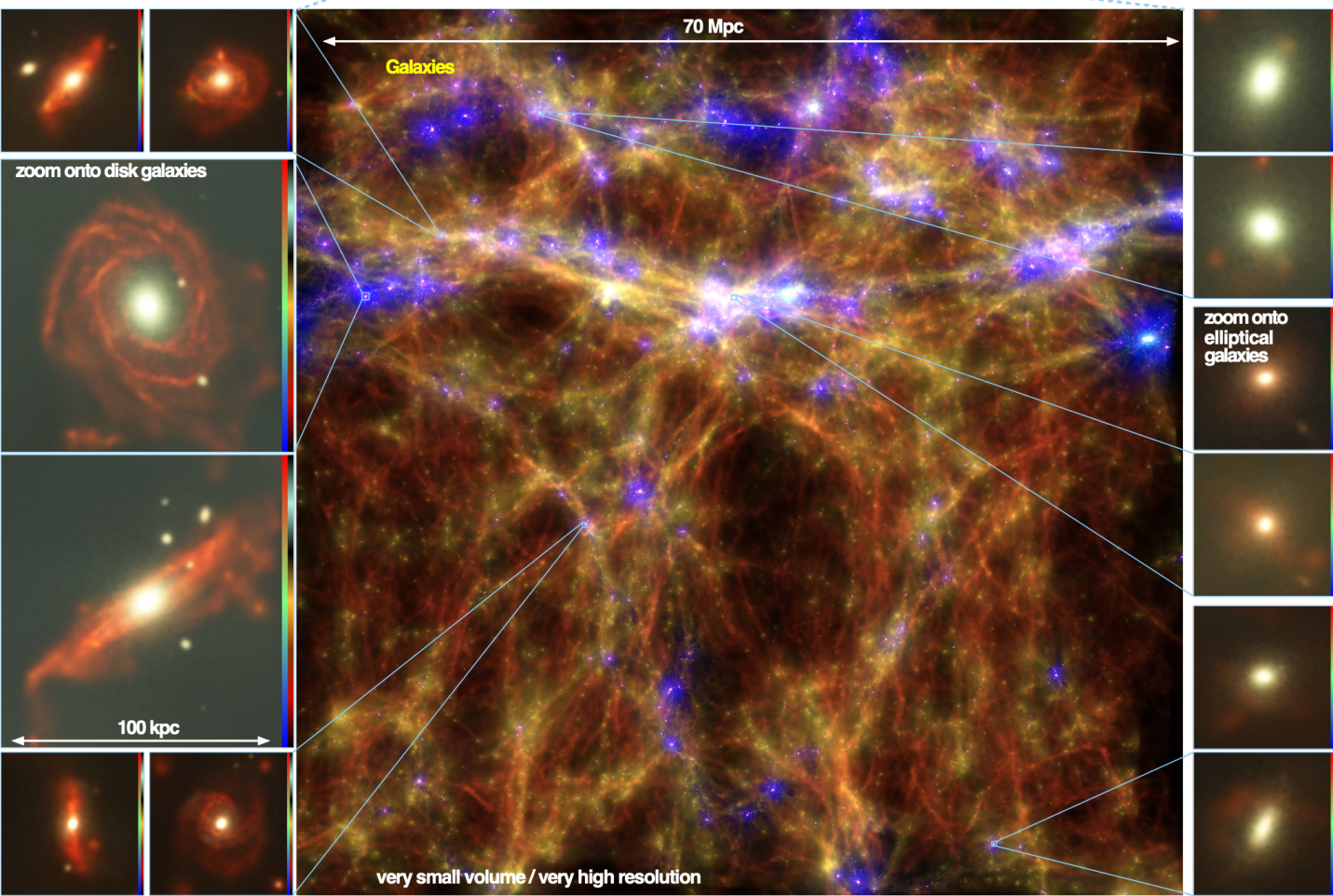
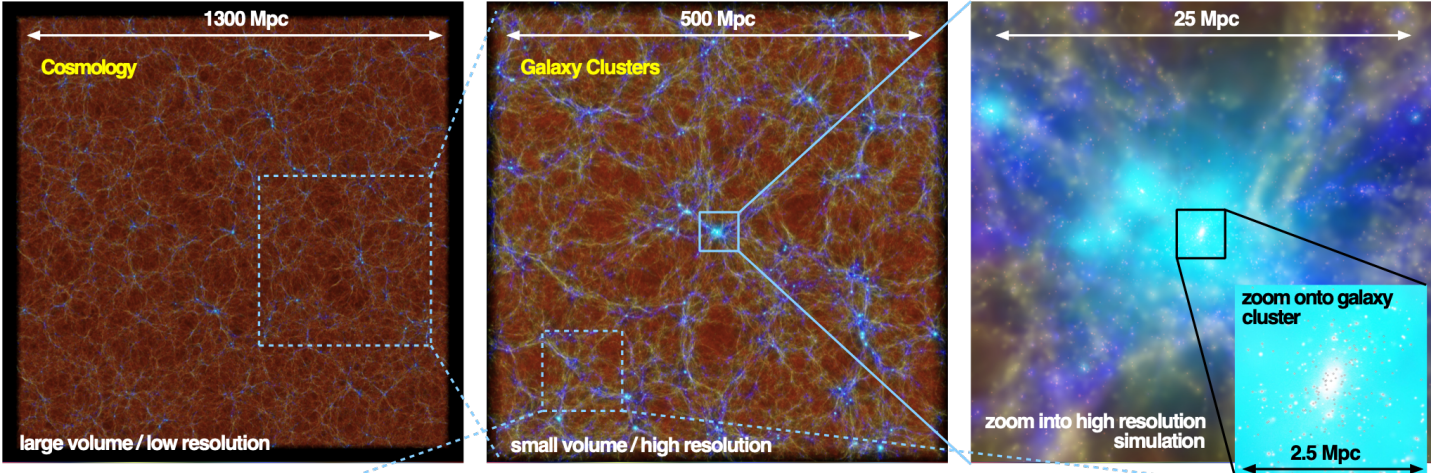
- Evolve cosmic structures from initial conditions set by CMB observations
- Include Dark Matter (N-body), Cosmic Baryons (hydrodynamics) & Dark Energy (cosmic expansion, ....)
- Use the most advanced supercomputing facilities currently available



## Crucial to compare to observations:

- To shed light on the dark constituents of the Universe
- To challenge models/theories for the formation of galaxies, clusters of galaxies, IGM, SuperMassive Black Holes, ...





- Which astrophysical processes drive the formation of galaxies and clusters of galaxies?
- What large cosmological surveys tell us about the Dark Constituents and the fundamental laws of the Universe?
- Co-design of simulation codes and hardware for future computational facilities (*including quantum computers*)

**@DF-UNITS:** *S. Borgani, M. Costanzi, P. Monaco, A. Saro*

**@INAF-OATs:** *U. Maio, G. Granato, G. Murante, E. Rasia, G. Taffoni, L. Tornatore, ...*