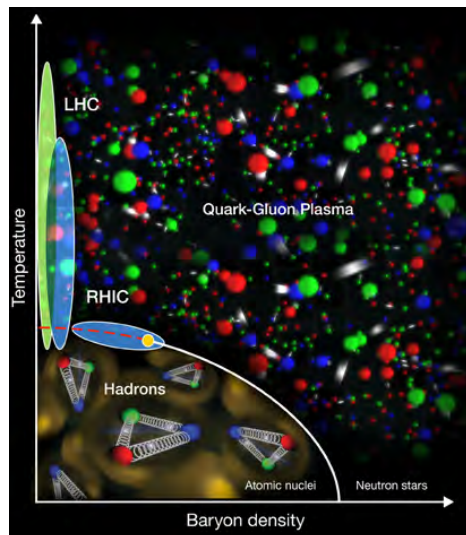


Theoretical investigations of Universe, Matter, and Life

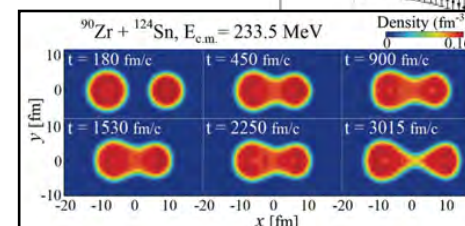
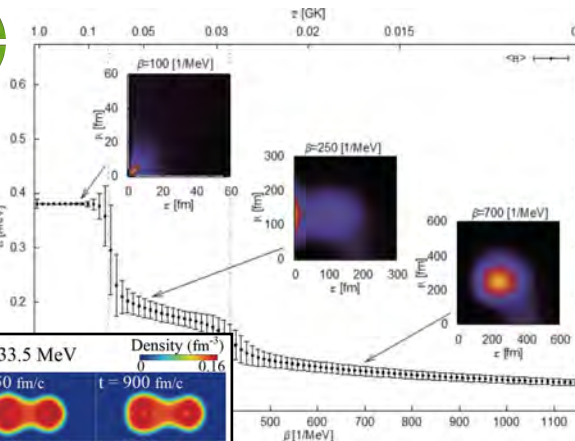
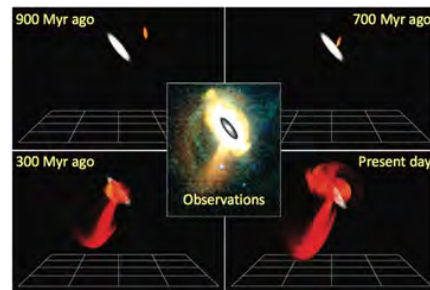
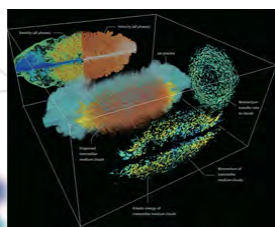
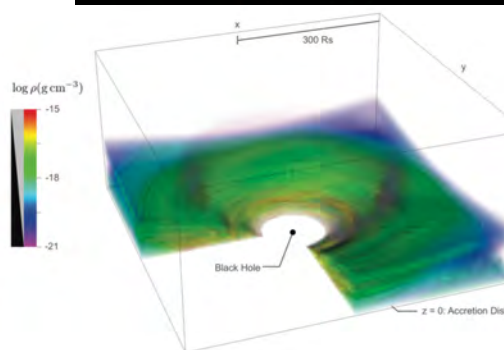
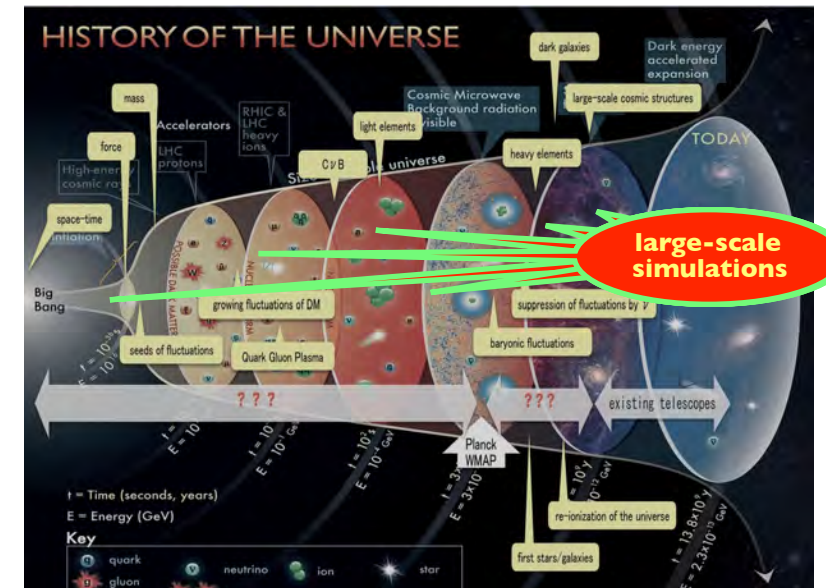
★ Large-scale simulation of Universe and Matter



Under a close collaboration with the **Center for Computational Science (CCS)**, carry out simulations on the Universe, matter, and life to clarify the origin of their generation and structure formation. Combine the latest results of theoretical and experimental studies.

- ◆ Determination of fundamental parameter of Nature
- ◆ Phase structure and equation of state of QCD at finite temperature and density

=> **Genesis of matter at 10^{-6} sec, inner structure of neutron stars, dark matter**



- ◆ Dark Matter, large-scale structure of the Universe
- ◆ Formation and collision of galaxies
- ◆ Black hole and gravitational wave
- ◆ Chemical evolution of the Universe

=> **Origin of structures of the Universe, origin of organic molecules and life**

★ Super-string and super-gravity theories

Investigations of the string theory towards quantum theory of gravity and unified theory of particles.

=> **Origin of the space-time, origin of particles and forces.**

- ◆ Nuclear reactions
- ◆ Unstable nuclei
- ◆ r-process

=> **Light and heavy elements in the Universe**

