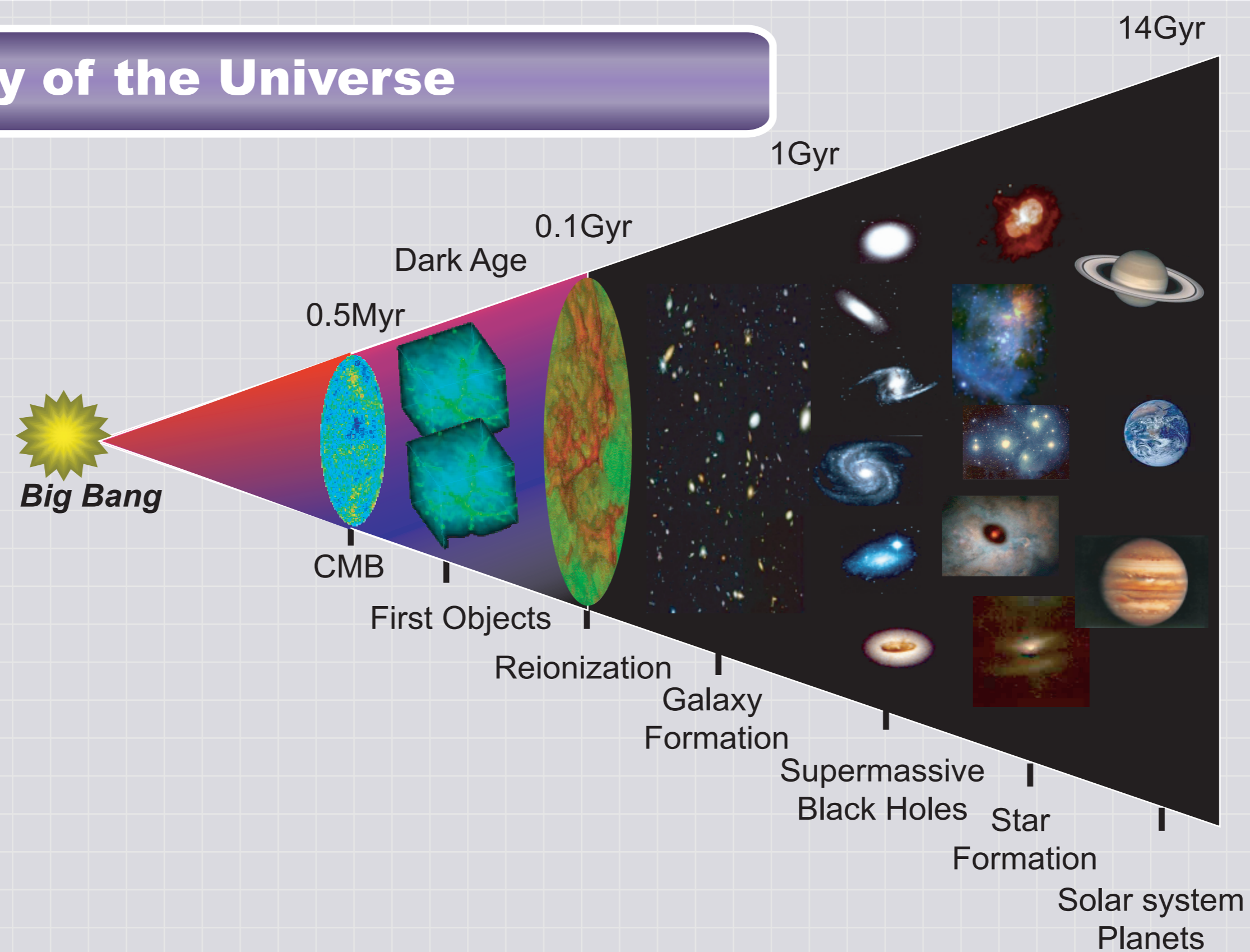




FIRST Project

History of the Universe



What's the **FIRST** Project ?

- ▶ This is the project for the elucidation on the origin of first generation objects in the Universe through large-scale simulations with HMCS-E (Heterogeneous Multi-Computer System-Embedded). The project is supported by a Specially Promoted Research in Grants-in-Aid for Scientific Research over four years (2004~2007) with the budget of 296.4 million yen (US\$2.7 million), approved by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan.

Three Features

SCIENCE

- ▶ First generation objects are what all the structure in the universe originates from and also what first heavy elements in the universe are generated from. They are thought to form in so-called cosmic dark age, that is, from 0.5 million years to 100 million years from the Big Bang. However, the origin of first generation objects is veiled in mystery and is the last missing link for the cosmic structure formation.

METHOD

- ▶ The formation of first generation objects is regulated by self-gravity, hydrodynamics, and radiation transfer. Hence, in order to elucidate the origin of first generation objects, we should solve radiation hydrodynamics with self-gravity in 3-dimensional systems. The 3-dimensional radiation hydrodynamics is a very first attempt in computational astrophysics.

NEW GENERATION COMPUTER

- ▶ For the realization of 3D radiation hydrodynamics, we build up a new generation of PC cluster system, FIRST (Fusional Integrator for Radiation-hydrodynamic Systems in Tsukuba University).