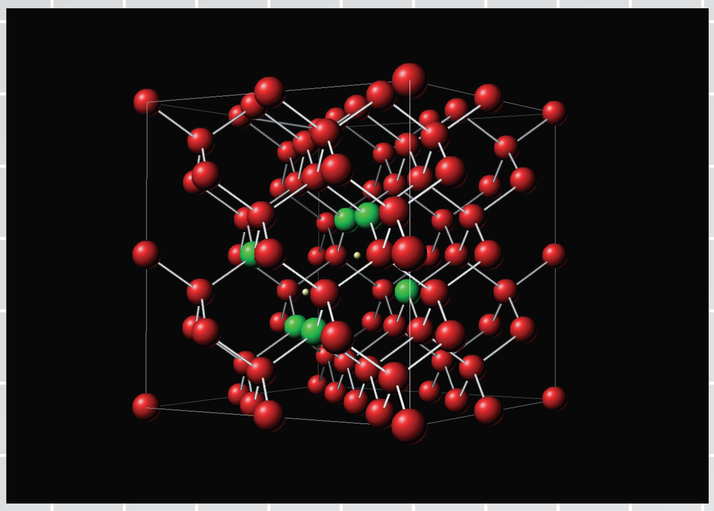
Center for Computational Sciences, University of Tsukuba
www.ccs.tsukuba.ac.jp

PACS-CS Project

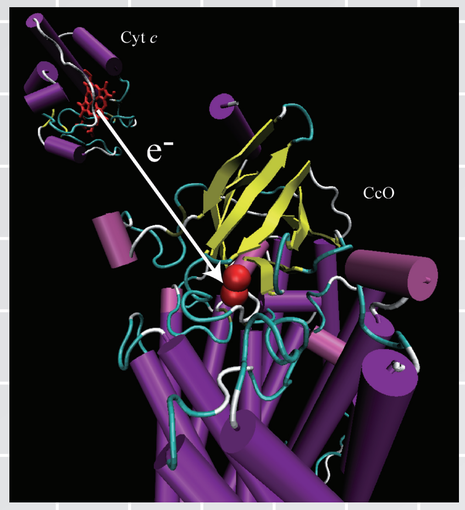
Project goals

- Advancement of computational sciences with emphasis on
  - materials and life sciences
  - particle physics and astrophysics
- Development of PACS-CS, a massively parallel cluster, for frontier simulations in these areas

Materials and Life sciences



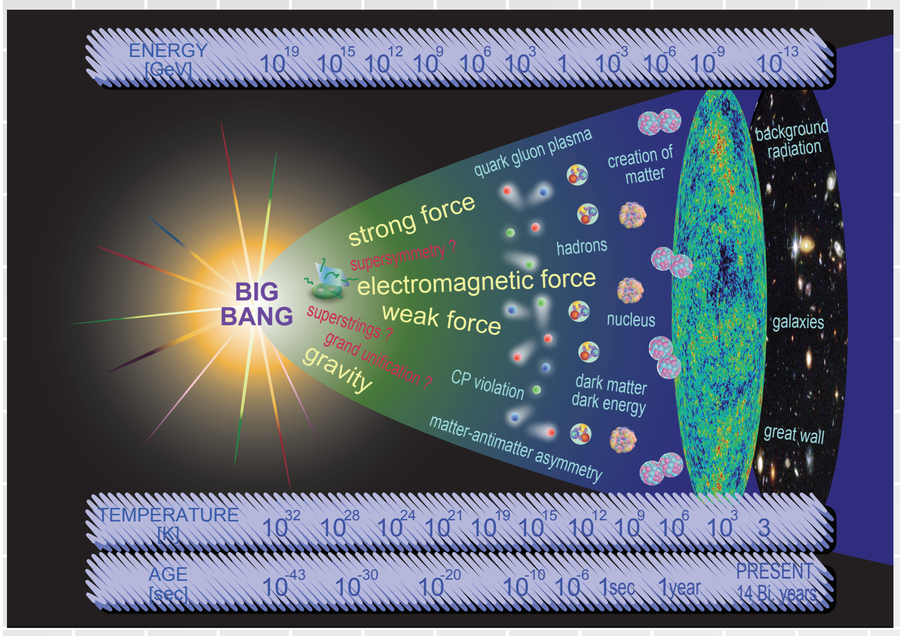
Divacancy in silicon



Electron transfer between
cytochrome c and cytochrome c oxidase

Large-scale quantum mechanical simulations provide a key for understanding and designing nano and bio materials having specific functions. The project aims to advance research in this area with a variety of methods including development of real-space DFT methods to 10^4 atoms and more.

Particle Physics and astrophysics



Credit: NASA/WMAP Science Team

How the Universe evolved from the hot and dense state just after the Big Bang 13.7 billion years ago is one of the fundamental questions of natural science. Advancing full QCD simulations to understand the role of hadron and quark gluon plasma in this history is one of the main targets of the Project.

Development of PACS-CS

Large-scale simulations in computational sciences require a high performance system with a balanced floating point capability and network performance. PACS-CS is a massively parallel system designed to achieve such a balance using cost-effective commodity components.

Basics specifications:

- 2560 nodes with single CPU/node
- 3d hyper crossbar network with 6 Gigabit Ethernet
- Peak performance 14.3TFLOPS
- Total memory 5.12 TByte