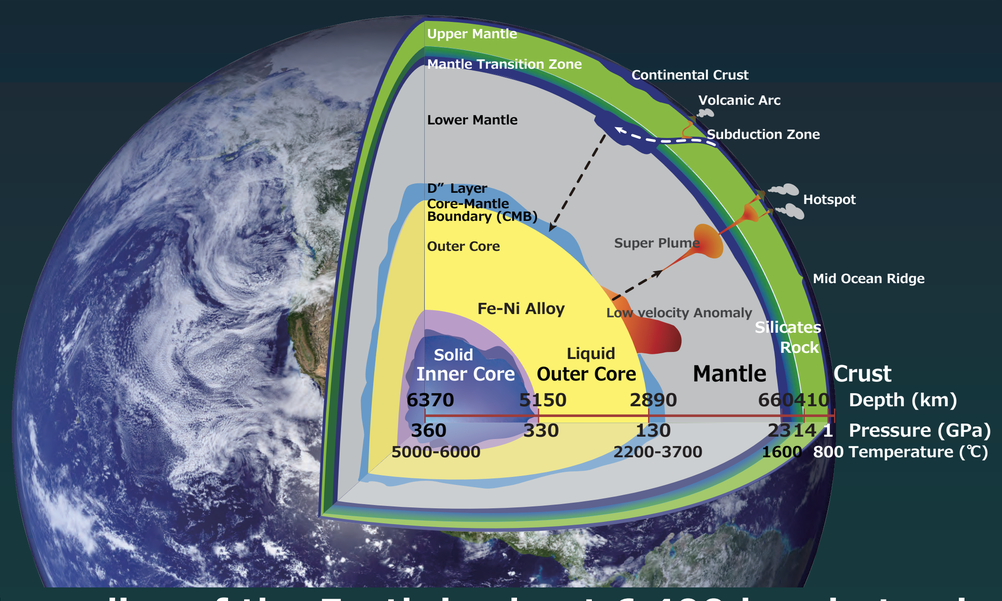
Geodynamics Research Center

Leading institute of high-pressure sciences

EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

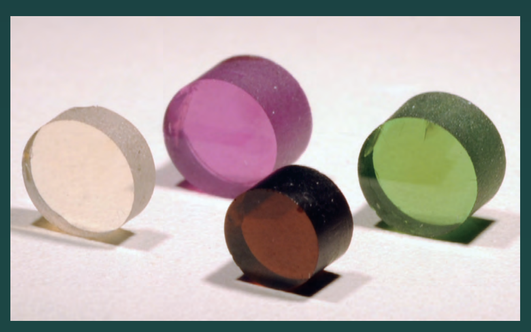
Earth, Planetary and Materials Sciences

Geodynamics Research Center (GRC) is an international research institute where researchers conduct leading-edge studies on materials and states of the Earth's deep interior in order to reveal dynamics and evolution of the Earth and planets, based on advanced high-pressure experiments and numerical simulations. We investigate various issues of the Earth and planetary sciences, chemical composition of the Earth's lower mantle, materials and structures of the Earth's core, Earth's deep water, internal structure of solar planets and exoplanets and dynamics of the planetary interior, and expand our techniques and knowledge to a field of material sciences for synthesizing novel useful materials such as the world-hardest material "HIME-Diamond".



The radius of the Earth is about 6,400 km, but only 10 km depth is achieved by drillings. The Earth's deep interior is an unreachable place where pressure and temperature at the center are estimated to be respectively 360 GPa and 5000 K or higher. Thus, high-pressure and temperature experiments and numerical simulations are essential tools to study dynamics and composition under such extreme conditions. Developments of the techiniques at GRC lead to an innovative area of high-pressure materials sciences; syntheses of newly novel materials which are obtainable only by high pressure experiments.

HIME-Diamond



Nano-polycrystalline garnet

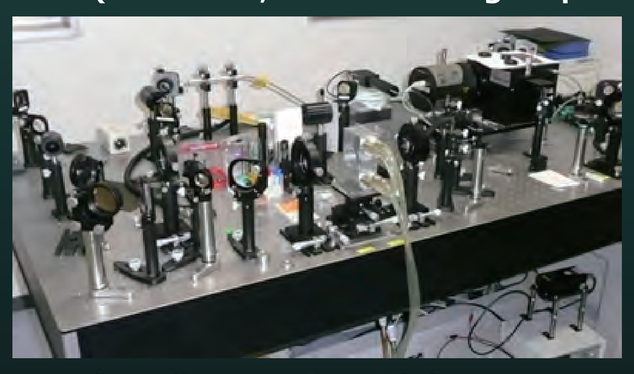
PRIUS: Premier Research Institute for Ultrahigh-pressure Sciences

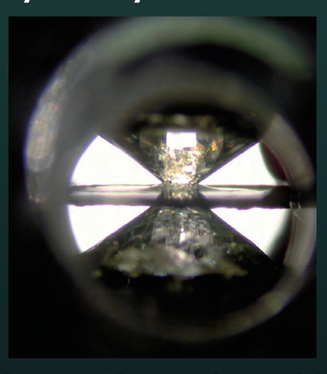
GRC operates PRIUS from 2013 which is one of the "Joint Usage / Research Centers" in Japan authorized by the Ministry of Education, Culture, Sports, Science and Technology. Missions of PRIUS, as an international education and research hub, are to conduct Earth and planetary science and material science research by using the high-pressure techniques with the objective of creating new fields of science thorough the international collaborations and interdisciplinary networks of researchers.

PRIUS

Multi-anvil apparatus (BOTCHAN, the world-largest press, 6000 tons).

Analytical system: ATEM and FIB.





Diamond anvil apparatus: High pressure and high temperature at the center of the Earth can be achieved.