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Science Research Bldg. 1, 4th floor.
Ehime Univ.

Keywords:
1. Planet Mercury
2. High pressure
3. Fe-rich liquid metals

Constraints on the interior structure and interior evolution of planet Mercury

A major interest in planet Mercury arises from its unexpectedly high bulk density, which was revealed around the year 1950. This high bulk density indicates that the planet is anomalously rich in Fe metal, which has invoked questions on how the formation of the metal-rich planet has come about. NASA's Mariner 10 and MESSENGER space missions to the planet have since revealed that an active magnetic field operates in Mercury's large metallic core, drawing ever more attention to the nature of and processes in Mercury's large metallic core. The ESA/JAXA collaborative space mission 'BepiColombo', the third and largest space mission to visit the planet, wil initiate its orbiting phase around Mercury at the end of 2025 and is expected to yield more stringent constraints on the interior structure and interior dynamics of the planet.

I will review available and upcoming geophysical measurements that constrain Mercury's interior structure and evolution. These measurables motivate experimental high-pressure measurements of thermophyscial properties and melting relations in the Fe-rich metallic system at conditions relevant for Mercury's core. The availability of such data is suboptimal at present and will expectedly yield the largest source of uncertainty for interpreting Mercury's interior in light of upcoming geophysical data. I present my project aim to obtain new experimental data of high accuracy of properties of liquid Fe-rich metal that will improve the interpretation of geophysical constraints of the planet in terms of Mercury's core and bulk composition. These are needed to improve the understanding of Mercury's formation and dynamo action.

GRC