

High pressure/high temperature: A view into the deep Earth

Catherine McCammon

Bayerisches Geoinstitut, Universität Bayreuth, D-95440 Bayreuth, Germany

The Earth's interior is largely inaccessible, but its properties and processes control much of what we observe on the Earth's surface. One successful strategy for probing the Earth's interior has been the comparison of measurements made at the surface, such as from seismology, with studies of the relevant minerals at the appropriate high pressure and temperature conditions in the laboratory. High pressures are reached using a diamond anvil cell, and ESRF beamlines with microfocus capabilities enable the small samples (often less than 100 microns in diameter) to be studied. Reaching high temperatures at high pressure is more challenging, however, but can be achieved using a high-power laser. We will report on the first experiments at ID18 to measure the elastic properties of deep Earth minerals at both high pressure and high temperature using nuclear inelastic scattering, and will discuss their implications for our current understanding of the Earth's interior.