Dynamics and Elasticity of Planetary Ices and Transition Metal under Extreme conditions

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High-energy resolution inelastic X-ray scattering (HERIX) and nuclear resonant inelastic X-ray scattering (NRIXS) are capable to investigate the elasticity and thermodynamic properties of planetary materials at high pressures and high temperatures. Inelastic X-ray scattering techniques thus are of great interest to the study of the Earth and planetary interiors.

Sound velocities and elastic properties of iron and iron alloys have been investigated under extreme conditions. High-temperature and light-element effects on the elastic anisotropy of iron have also been studied through single crystal HERIX measurements. These experimental results are used to interpret seismic observations of our planet's interior. The advent of the new ultrahigh resolution IXS beamline at NSLS-II will offer the unique opportunity to investigate the low-Z materials such as planetary ices.