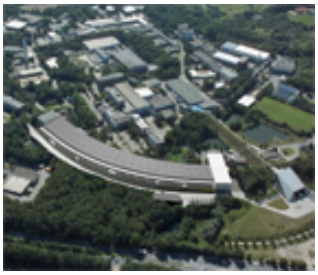

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# Brillouin Scattering at High Pressures and Temperatures: Potential Applications at a 3rd Generation Synchrotron Source such as PETRA III

*Tuesday 19 May 2009 15:00 (45 minutes)*

Brillouin spectroscopy is a technique that allows us to measure the shear elastic properties of solids at very high pressures and temperatures relevant for interpreting seismic heterogeneity in the deep Earth. In particular, Brillouin spectroscopy is one of the very few methods that can allow us to determine the full single-crystal elastic tensor of solids up to extreme conditions, with applications to the interpretation anisotropy from large scale seismic data. In addition to this, Brillouin scattering has a potential for the study of the equation of state of fluids at high pressures and temperatures. It allows us the determination of density by integration of the bulk modulus as a function of pressure. The determination of the density of complex amorphous solids is another relevant issue that could be addressed by Brillouin scattering, in combination with more demanding experimental techniques and computations that can offer complementary fine-structure information.
We propose a strategy for effectively integrating off-line Brillouin scattering measurements, X-ray diffraction and X-ray inelastic scattering at a 3rd generation synchrotron source. For instance, by combining Brillouin scattering and synchrotron X-ray diffraction in both axial and radial geometry we can develop a powerful tool for the study of the elastic behavior of unquenchable high-pressure solids synthesized as polycrystals, whose Brillouin scattering signal can only be interpreted based on the precise characterization of lattice-preferred-orientation.
Together with a range of applications of Brillouin scattering and synchrotron techniques at extreme conditions, we will also discuss perspectives about future technical developments to the current experimental design for high-pressure high-temperature Brillouin scattering in the diamond-anvil cell.

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