s6.m1.o1 **Recent developments in the realization of a practical pressure scale for extreme conditions.** W.B. Holzapfel, *FB Physik, University of Paderborn, 33095 Paderborn, Germany*
Keywords: extreme conditions.

Theoretical constraints on the analytic forms for the representation of equations of state for "regular" solids together with new critical inspections of available shock wave data, new constraints on the Grüneisen parameters, and the use of accurate ultrasonic data for the bulk moduli result in the realization of a practical pressure scale, which uses equations of state of some calibrants like Cu, Ag, and Au, and allows for realistic estimates of the uncertainties related to this pressure scale even under extreme conditions and not only at ambient temperature but also in wide ranges of temperature from OK up to the relevant melting curve. These new data will be compared with previous pressure scales based on the same calibrants.

s6.m1.o2 **Advances in high-pressure experiments combining XAS, temperature scans, and ESXD.** A. Filipponi[1], J. P. Itiè[2], A. Di Cicco[3], *[1]INFM and Dip. Di Fisica, Università L' Aquila, Italy, [2]LPMC, Univ. Paris 6, 2 place Jussieu, Paris, France, [3]INFM and Dip. di Matematica e Fisica, Universitá di Camerino, Camerino (MC), Italy*
Keywords: X-ray absorption spectrosocpy, high-pressure, liquids

The availability of high-brilliance tunable hard x-ray beams at the European Synchrotron Radiation Facility, or other third generation synchrotron radiation sources, has opened new opportunities for x-ray absorption spectroscopy (XAS) investigation in the high-pressure field. At the ESRF-BM29 XAS beamline we have developed[1] and recently exploited novel experimental techniques suitable for high-pressure high-temperature studies using the Paris-Edinburgh press or other high-temperature devices. This experimental station combines XAS with x-ray absorption temperature scans, and energy scanning x-ray diffraction (ESXD). Temperature scans are performed by ramping the heating power of the sample oven at the desired speed. From the observation of the changes in the x-ray absorption coefficient at constant energy (chosen at significant points, to enhance structural or electronic sensitivity) it is possible to reveal the occurrence of phase transitions (solid-solid, melting ...) and to access important physical properties such has the nucleation rate of the stable crystalline structures in an undercooled liquid or the liquidus curve in eutectic binary phase diagrams. X-ray diffraction, which is essential for pressure calibration and sample diagnostic, is detected using a fixed angle high-resolution collimator. With this detection method it is possible to reach a sensitivity of 10^{-4} in lattice spacing determinations. The q-scan is performed through a monochromator energy scan[1].

With such a unique setup, which combines experimental techniques sensitive short and long-range structural properties, it is possible to study condensed matter in the liquid and solid phases in a wide pressure and temperature range (P=0.2-10 GPa and T=300-1500 K). Recent applications to pure Ge and Ag:Ge alloys will be presented.

[1] A. Filipponi, M. Borowski, D. T. Bowron, S. Ansell, S. De Panfilis, A. Di Cicco, and J.-P. Itiè, Rev. Sci. Instr. (to be published, 2000).