

Science at High pressure: some new results and future challenges for synchrotron studies

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Over the past 20 years, the use of 3rd generation synchrotron facilities has become essential in the study of materials at very high pressure. A major achievement of the High Pressure field is certainly that the properties of materials at Mbar pressures can now be studied almost as completely and as accurately as if at ambient pressure. In particular, many techniques of the synchrotron facilities have been adapted to investigate high pressure effects.

The driving forces of high pressure research in front of synchrotron facilities cover a very large spectra from the discovery of new condensed matter effects at high density, the synthesis of new materials with ultra-hardness, superconductivity or high energy storage properties, to the understanding of the equation of state of the constituent materials of earth and planetary interiors.

In this talk I will try to highlight some important issues in high pressure research, how the use of synchrotron radiation has been helpful in tackling them, what insights have been achieved. The selection of examples will be biased by my own interest for low Z molecular systems. New results will be discussed. Future challenges will be proposed.

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