

What can we learn from high-pressure studies.

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High pressure is a powerful method to tune in controllable manner the interatomic distances in crystal and the consequent properties of the investigated system. In response to application of high pressure, condensed matter undergoes structural, electronic, magnetic and other phase transitions leading to unusual and sometimes unexpected properties of matter.

The knowledge of the structure of matter under compression is both of technological and fundamental interest. The science of matter at high density is now providing bases for fundamental understanding of atomic and molecular interactions in matter, giving new insights into the properties of materials at ambient conditions, and indicating the roots for the synthesis of the novel materials with exotic properties.

Although setting up a high-pressure experiment is very difficult and time consuming, studies of pressure effect on properties of matter can now be performed using nearly all the experimental techniques of condensed-matter physics in temperature range from mK to thousands of K and/or at high magnetic fields.

In this lecture, the basics of high-pressure science and technology will be discussed. The techniques of generation and measurement of static high pressure and experimental methods of studies of physical properties of matter under extreme conditions will be presented.