Undergraduate engineering major helps design new facility for loading high-pressure vessels with gaseous media and specimens

A comprehensive understanding of phenomena at extremely high pressures and temperatures, like those in the center of the Earth, relies on a combination of complementary experimental techniques. During the last few years, the Cornell High Energy Synchrotron Source (CHESS) has concentrated efforts on an integrated approach to study pressure-volume-temperature (PVT), equations of state (EOS) and phase transitions. Current capabilities are based on diamond anvil cells (DAC) and a variety of optical and x-ray techniques.

Cornell engineering undergraduate Eric Angle helped design and build a high-pressure vessel needed to fill diamond-anvil cells with gases used in materials studies.

Cornell Undergraduate Eric Angle led the design and construction of a novel high-pressure gas loading system for DACs. DACs are used to explore the properties of gases at pressures encountered deep within the outer planets, or for use as pressurization media for studies of minerals and metals deep within the earth. Loading the DAC with gases has historically been a major difficulty limiting many studies; this system overcomes this difficulty. The DAC gas loading system considerably extends capabilities in high-pressure science possible at CHESS, and making the facilities now available to scientists across the US will help advance studies relevant to materials in the Earth's core.

This work is notable because a new capability is readily available to US scientists to study gaseous samples under extreme conditions. In addition, inert gaseous media can now provide better isotropic hydrostatic conditions for studying a wide variety of materials in diamond-anvil cells.

See also:

CHESS Newsletter 2005 article on research activities in high-pressure at CHESS.