

High pressure

facility at B1

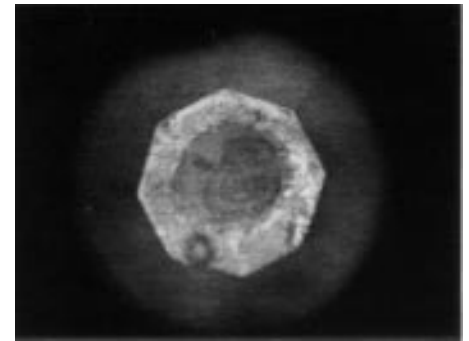
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The CHESS High Pressure Facility exists to provide experimental support for high pressure experiments with diamond anvil cells. In these cells, pressures from around 0.1GPa (1kbar) to well over 100GPa (1Mbar) can be generated. The facility has two stages for mounting diamond anvil cells. One is permanently installed in the B1 hutch while the second apparatus can be used in any of the larger stations (A2, A3, D1, F1, or F2). In addition there is a microscope and some software support for preliminary data analysis. Energy dispersive diffraction is generally used at B1 although some Laue experiments have also been done.

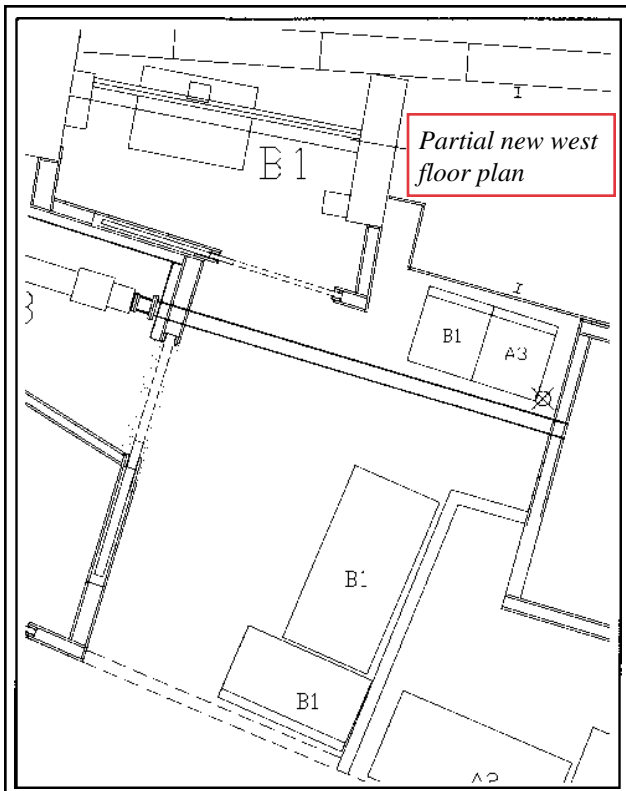
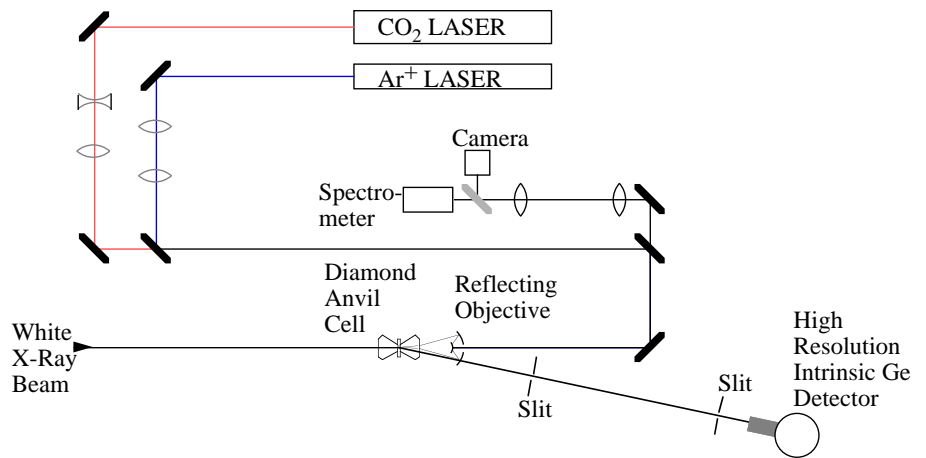
A schematic of the diffraction and optical system in the B1 hutch is shown above. Currently the Ar⁺ laser is used for ruby and Sm-YAG pressure measurements. The first version of the optics, installed in February 1992, were difficult to align and use, however, recent improvements should make the setup very easy: Beam-steering mirror mounts are being replaced with kinematic mounts with precision adjustments and several new degrees of freedom have been added to make it easier to direct the argon ion laser light.

Experiments using the CO₂ heat-

ing laser are planned for as soon as the A-Line construction is complete enough to allow B-Line to operate.



Sample in diamond anvil cell after heating to 2300K with CO₂ laser.



The second apparatus has been used in A3 for energy dispersive diffraction and in A2 for collecting Debye-Scherrer data as well as for collecting XAFS data.

The new A-Line reconstruction will affect the High Pressure Line at B1 in several ways. First, much of the reconstruction cannot take place while B1 is operating, so B1 will be down from the beginning of January until utilities can be restored to B1 and the dust has settled a bit. Second, the B1 hutch will be enlarged somewhat and the door will be replaced by the "east" EZ-Slide style (see figure). Third, the floor plan will be changed significantly: The computer will be placed much closer to the experiments and the laser curtain will be placed so that all the High Pressure Line equipment and computer will be accessible while the curtain is closed. The entire B1 floor plan will be under the 8foot ceiling and a stud wall will be placed between B1 and A2 so the noise and traffic problems that currently plague the B1 users will be eliminated. Since A3 will no longer be a working experimental station during normal running, the B1 users will not have to share the space around the B1 door with the A3 users. Although the changes will require B1 to be off-line for two or three months, the new facility will be a much better place to do experiments.