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Protein Crystallography with Spallation Neutrons. Leighton Coates, Paul Langan, Benno Schoenborn, Bioscience Div., Mailstop M888, Los Alamos National Lab, Los Alamos, NM, 87545.

The PCS (Protein Crystallography Station) at Los Alamos Neutron Science Center, is a high performance neutron protein crystallography beam line funded by the office of Biological and Environmental Research of the U.S. Department of Energy. Beam-time is free to expert and non-expert users and is allocated twice a year through a call for proposals and a peer review process.

Although most protein structures are determined using X-rays the position of hydrogen atoms and the coordination, sometimes even the position of water molecules cannot be directly determined at resolutions typical for most protein crystals. Hydrogen atoms are the primary motive force in most enzymatic processes. Neutron diffraction is a powerful technique for locating hydrogen atoms even at resolutions of 2-2.5 Å and can therefore provide unique information about enzyme mechanism and hydrogen bonding.