

MAD Applications

Craig M. Ogata

Howard Hughes Medical Institute, c/o Brookhaven National Laboratory, Building 725, Beamline X4, Upton, NY 11973, U.S.A.

Wayne Hendrickson

Howard Hughes Medical Institute, Dept. of Biochemistry and Molecular Biophysics, Columbia University, New York, NY 10032, U.S.A.

Over the last couple of years there has been a rapid growth in the use of the multiwavelength anomalous diffraction (MAD) method for phasing biological macromolecule structures. These results cover an ever increasing assortment of elements, their corresponding absorption edge energies, and the methods in which they are introduced into the proteins or nucleic acids. There are abundant examples of the use of selenomethionine-expressed proteins in both MAD and MIR applications, as well as steady growth in the use of heavy atom derivatives in MAD phasing. The larger Bijvoet and dispersive differences from the LIII edges of the commonly used heavy atom compounds continues to push the application to molecules of increasing size.

A brief overview of MAD applications combined with results from the Howard Hughes Medical Institute beamline X4A at the National Synchrotron Light Source will be presented. This will be combined with a variety of specific examples illustrating the use of various edges (K, L, and M) and methods of introducing anomalous scatterers into molecules.