

UniCat Colloquium

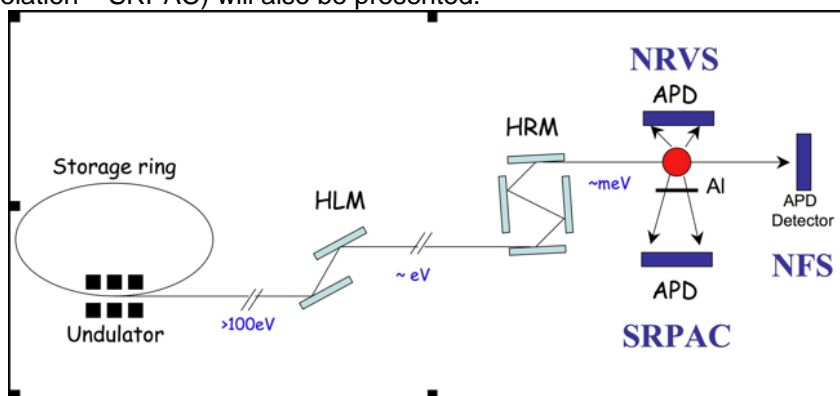
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Lecturer: **Prof. Stephen P. Cramer**, *Department of Applied Science, University of California, Davis, CA, Physical Biosciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA*

Title: **NRVS – Vibrational Spectroscopy with Nuclear Resonances and Synchrotron Radiation: A Tutorial with Applications to Hydrogenase and Nitrogenase**

Abstract: Nitrogenase is the enzyme responsible for the 'fixation' of nearly inert atmospheric dinitrogen to ammonia. It is ultimately responsible for half of the world's protein, while the other half depends on industrial fertilizer produced with hydrogen derived from fossil fuels. Another type of enzyme, hydrogenase, catalyzes the interconversion of dihydrogen with protons and electrons. These enzymes use unusual forms of Fe-S clusters or Fe carbonyls, and their catalytic mechanisms are not understood.

A powerful and relatively new way to study Fe in biological systems is Nuclear Resonance Vibrational Spectroscopy (NRVS). In this synchrotron radiation technique, a sample is excited with a ~ 1 meV bandwidth beam near the Mössbauer resonance, and the delayed fluorescence is recorded as a function of excitation energy. When applied to Fe-containing samples, NRVS is only sensitive to vibrations involving motion of ^{57}Fe . We will present results on model compounds, small Fe-S proteins, and nitrogenase, and hydrogenase, and the needs and prospects for future improvements will be discussed. If time permits, results using other isotopes and other nuclear spectroscopies (nuclear forward scattering – NFS and synchrotron perturbed angular correlation – SRPAC) will also be presented.



Date: **Friday, 11 March 2011**

Time: **5:15 pm - around 6:45 pm**

Location: **TU Berlin, Institute of Chemistry,**

Coffee and tea will be served thirty minutes prior to the lecture start.
Guests are cordially invited to attend!

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence UniCat