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学术报告通知

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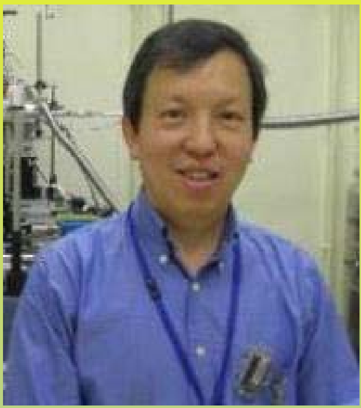

演讲者： **Dr. Hongxin Wang，Senior Scientist**
University of California at Davis
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题　目： **Nuclear Resonant Vibrational Spectroscopy: Pursuing Iron in Structural Biology**

时　间: 2018年4月19日(星期四) 9:30

地　点: 高能所，图书馆二层会议室

主持人：王黎明 副研究员

报告摘要：

Nuclear resonant vibrational spectroscopy (NRVS) measures vibrational transitions that occur together with the nuclear transitions in ^{57}Fe resonator and possesses distinguished advantages, which make it capable of pin-pointing iron structure(s) inside complicated enzymes. Hydrogenases (H_2ases) catalyze the reversible reaction of $2H^+ + 2e^-$ H_2 and has a potential role in the future economy in the post-fossil-fuel-era. The Fe-S and Fe-CO/CN features inside various iron enzymes were observed and understood earlier, but the Fe-H/D related features have been out of reach for long due to their weak intensities.

In this presentation, we will first introduce what is NRVS, how NRVS resolves the bio- Fe-S and Fe-CO structures and then focus on the observation and understand of several extremely weak (~0.1 cts/s) Fe-H bending vibrations in *Desulfovibrio vulgaris* Miyazaki F [NiFe] H_2ase (*Dv*MF for abbreviation), *Chlamydomonas reinhardtii* [FeFe] H_2ase (*Cr-HydA1)* and *Desulfovibrio desulfuricans* [FeFe] H_2ase (*Dd-HydAB*) and their variants. For example, NRVS for the WT *Cr-HydA1* (b) as well as ODT (a) and C169S (c) variants are shown as in Figure 1. While the out-of-plane wagging band (blue indicator) varies little, the in-plane bending band (red indicator) has very different positions for different enzymes (726→744→774 cm^{-1}). This difference shines light into the ADT's interaction with H^+ transfer function in these enzymes.

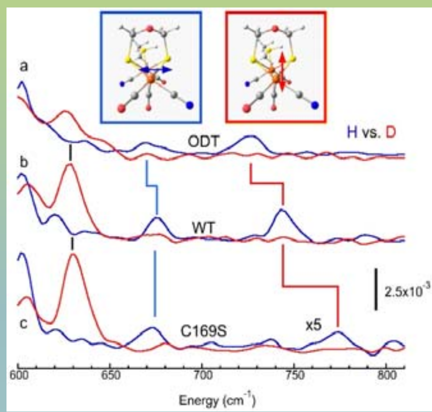

Figure 1. Observed NRVS for (a) ODT; (b) WT; (c) C169S *Cr-HydA1* prepared under H_2/H_2O (blue) and D_2/D_2O (red).

个人简介:

王宏欣, 博士， 高级科学家，现为美国加州大学戴维斯分校化学系研究员和伯克利国家实验室客座研究员，从事生物大分子的同步辐射能谱学研究有二十五年。他先后在美、加、日、法等国的十个同步辐射中心、三十条光束线上工作过：工作范围从远红外至65 keV的各类X-射线辐射，应用涵盖硬、软X-射线能谱学、磁圆二色谱学、散射能谱学等各种先进的X-射线能谱学方法和相关的多种实验技术。生物化学方面的工作主要涉及铁硫蛋白，氢化酶，固氮酶、光合作用酶等含锰、铁、镍、钴、铜、钒和钼等过渡族金属的蛋白、酶和它们的模型配位化合物。发表科学论文88篇，论文总被引用一千次以上，其中有6篇的单篇被引用次数为61-95次。从2004年至今主要从事核振散射对生物大分子的振动谱学的研究。

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