

## Valeria Starovoitova

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<b>SUMMARY</b>	Solid background in experimental biophysics, visible and x-ray spectroscopy, broad programming experience, excellent analytical and organizational skills.	
<b>EDUCATION</b>	PhD, Physics, Purdue University, West Lafayette, IN, USA PhD Thesis: "Iron dynamics in heme proteins and heme compounds", GPA 3.4/4.0	<b>May 2007</b>
	BS, Physics, St-Petersburg State University, St-Petersburg, Russia BS Thesis: " Electron scattering studies of intercalated graphite compounds", GPA: 3.4/4.0	<b>June 1996</b>
<b>RESEARCH EXPERIENCE</b>	<b>Graduate Research Assistant, Purdue University, Physics Department + Argonne National Lab</b>	<b>2001-present</b>
	<ul style="list-style-type: none"> <li>The subject of my research is heme proteins, namely the connection between their structure, dynamics and functions. We perform our experiments at the Advanced Photon Source, Argonne National Laboratory, using relatively new x-ray synchrotron technique - Nuclear Resonance Vibrational Spectroscopy (NRVS), which was designed for Mossbauer nuclei, in our case - <math>^{57}\text{Fe}</math>. If a vibrational mode has energy equal to the difference between the x-ray beam and the <math>^{57}\text{Fe}</math> nuclear resonance (14.4 keV), the resonance can be excited, and subsequent deexcitation can be detected as Fe fluorescence. By monitoring this fluorescence as the x-ray energy is scanned through the resonance, Fe vibrational density of states can be obtained.</li> <li>To characterize vibrational density of states spectrum Normal Mode Analysis (NMA) calculations are performed for heme compounds. We treat a compound as a set of balls and springs, introduce a force field and vary force constants until there is a good fit between experimental NRVS data and NMA calculations. Although the problem is extremely underdetermined, there is a number of constraints such as typical force constant value or symmetry considerations which have to be taken into account during the refinement process.</li> <li>Due to computer limitations, NMA can not be performed on the whole protein molecule, instead we do it for heme site only; however, heme site dynamics is highly correlated with the whole protein molecule motion. Thus, we can, at least partially, try to answer the question about the correlation between structure, dynamics and functions of heme proteins.</li> </ul>	
	<b>Research Assistant, Ural Institute of Physics of Metals, Russian Academy of Science</b>	<b>1998-2001</b>
	<ul style="list-style-type: none"> <li>The subject of this research was to study photoinduced lattice vibration modes associated with charged 3d impurities (in particular, Ni) in II-IV semiconductors (ZnSe, ZnO) and solid solutions ZnSSe and ZnCdSe. Experimental optical exciton-vibration spectroscopy was utilized to reveal that the local vibration modes are coupled, which was due to strong anharmonicity of the local vibrations. Analysis of phonon replicas of the zero phonon line in the spectra allowed one to elucidate the nature of the anharmonicity.</li> <li>Model calculations performed for ZnSe: Ni and ZnO: Ni crystals revealed that the nearest neighbor environment of a charged Ni impurity is highly distorted. A change in the charged state of Ni leads to shifts in lines of calculated and experimentally measured x-ray emission spectra and, therefore, should be taken into account.</li> </ul>	
<b>TEACHING EXPERIENCE</b>	<b>Graduate Teaching Assistant, Purdue University</b>	<b>2001-present</b>
	<ul style="list-style-type: none"> <li>Lectured algebra based introductory Mechanics (350 students in a class) and Electricity (200 students)</li> <li>Developed and taught advanced Mechanics laboratory courses</li> <li>Taught advanced Electricity and Magnetism recitation classes for engineering students</li> </ul>	
	<b>Instructor, Gifted Education Resource Institute (GERI) Summer Camp, Purdue University</b>	<b>2004-present</b>
	<ul style="list-style-type: none"> <li>Developed and taught several physics related middle and high school courses for GERI Summer Camp students, such as "Physics of Human Body", "Physics in Science Fiction", "Astrophysics" and "Physics for Engineers"</li> </ul>	
	<b>Teaching Instructor, Minority Engineering Program, Academic Boot Camp, Purdue University</b>	<b>Summer 2006</b>
	<ul style="list-style-type: none"> <li>Developed and taught 5 weeks Mechanics course specially designed to provide a smooth transition for multi-ethnic students from their first year engineering to more challenging specific schools of engineering</li> </ul>	

<b>LEADERSHIP EXPERIENCE</b>	<b>Women in Science Leadership Team Member, Purdue University</b>	<b>2005-present</b>
<b>RELEVANT SKILLS</b>	<ul style="list-style-type: none"> <li>Organized monthly dinner meetings with featured speakers – successful women in science to form a supporting environment that fosters success for female students from their freshman year through PhD</li> <li>Computer languages: FORTRAN, C</li> <li>Computer software: Matlab 7.0, Origin 7.5, Gaussian, Mercury, CHARMM</li> </ul>	
<b>HONORS AND AWARDS</b>	<ul style="list-style-type: none"> <li>Graduate Teacher Award, Center of Instructional Excellence, Purdue University</li> <li>Lijuan Wang Memorial Award – for outstanding achievements in teaching and research, Physics Department, Purdue University</li> <li>Leadership Award, Physics Department, Purdue University</li> <li>Outstanding Teaching Assistant Award, American Association of Physics Teachers</li> <li>1st Honorable Mention, Sigma Xi Graduate Student Poster Competition</li> <li>Purdue Graduate Student Government Travel Award, Purdue University</li> <li>Women in Science Travel Award</li> <li>Purdue Research Foundation Grant, Purdue University</li> <li>Purdue Research Foundation Grant, Purdue University</li> </ul>	<b>March 2007</b>  <b>July 2006</b> <b>May 2006</b> <b>March 2006</b> <b>Feb 2006</b> <b>Nov 2005</b> <b>Oct 2005</b> <b>Summer 2005</b> <b>Summer 2004</b>
<b>PUBLICATIONS</b>	<ol style="list-style-type: none"> <li>Valeria Starovoitova, Graeme R.A.Wyllie, W.Robert Scheidt, Stephen M Durbin, Normal mode analysis of heme compounds: from single molecule study to crystal calculations, in preparation</li> <li>Valeria Starovoitova, Graeme R.A.Wyllie, W.Robert Scheidt, Stephen M Durbin, Vibrational spectroscopy and normal mode analysis of Fe(II)octaethylporphyrin, <i>Journal of Physical Chemistry B</i>, 110, 13277, 2006</li> <li>Valeria Starovoitova, Graeme R.A.Wyllie, W.Robert Scheidt, Stephen M Durbin, Iron dynamics in the simplest model heme: Fe(OEP) normal mode determination, <i>Biophysical Society's 50th Annual Meeting Proceedings</i>, 2006</li> <li>Sokolov V.I., Gruzdev N.B., Shirokov E.A., Starovoitova V.N., Experimental and theoretical studies of lattice distortions caused by charged 3d impurities in II-IV semiconductors, <i>Physics of the solid state</i>, 44 (8): 1526-1528, 2002</li> <li>Sokolov Victor I., Starovoitova Valeria N., Nickel impurity excitons and photoinduced lattice distortion in ZnSe<sub>1-y</sub>S<sub>y</sub>; Ni and Zn<sub>1-x</sub>Cd<sub>x</sub>Se: Ni solid solutions, <i>Semiconductors</i>, 35 (2): 138-143 2001</li> <li>Starovoitova V.N., Lattice vibrations due to charged 3d impurities in II-IV semiconductors, <i>IV International Conference for Young Scientists and Students Proceedings</i>, 2001</li> <li>Starovoitova V.N., Experimental studies of free and localized excitons ZnSSe and ZnCdSe with Ni impurities, <i>III International Conference for Young Scientists and Students Proceedings</i>, 2000</li> </ol>	
<b>CONFERENCE PRESENTATIONS</b>	<ol style="list-style-type: none"> <li>Valeria Starovoitova, Graeme R.A.Wyllie, W.Robert Scheidt, Stephen M Durbin, Normal mode analysis of heme compounds: from single molecule study to crystal calculations, <i>APS Users Meeting</i>, May 2007, Advanced Photon Source, Argonne National Laboratory, Argonne, IL</li> <li>Valeria Starovoitova, Stephen M Durbin, Iron normal mode dynamics in heme proteins, <i>Sigma Xi Poster Competition</i>, March 2007, Purdue University, West Lafayette, IN</li> <li>Valeria Starovoitova, Stephen M. Durbin, Nuclear Resonance Vibrational Spectroscopy as a probe of iron dynamics in heme proteins and compounds, <i>Gordon Research Conference on Vibrational Spectroscopy</i>, July 2006, Biddeford, ME</li> <li>Valeria Starovoitova, Graeme R.A.Wyllie, W.Robert Scheidt, Stephen M Durbin, Iron dynamics in the simplest model heme: Fe(OEP) normal mode determination, <i>Biophysical Society's 50th Annual Meeting</i>, February 2006, Salt Lake City, UT</li> <li>Valeria Starovoitova, Stephen M Durbin, Iron normal mode dynamics in heme proteins, <i>Sigma Xi Poster Competition</i>, February 2006, Purdue University, West Lafayette, IN</li> <li>Starovoitova V.N., Lattice vibrations due to charged 3d impurities in II-IV semiconductors, <i>IV International Conference for Young Scientists</i>, May 2001, St-Petersburg, Russia</li> <li>Starovoitova V.N., Experimental studies of free and localized excitons ZnSSe and ZnCdSe with Ni impurities, <i>III International Conference for Young Scientists</i>, January 2000, Dubna, Russia</li> </ol>	
<b>PROFESSIONAL AFFILIATIONS</b>	<ul style="list-style-type: none"> <li>American Physical Society</li> <li>Biophysical Society</li> <li>Sigma Xi, Scientific Research Society</li> <li>American Association of Physics Teachers</li> </ul>	
<b>REFERENCES</b>	Available upon request	