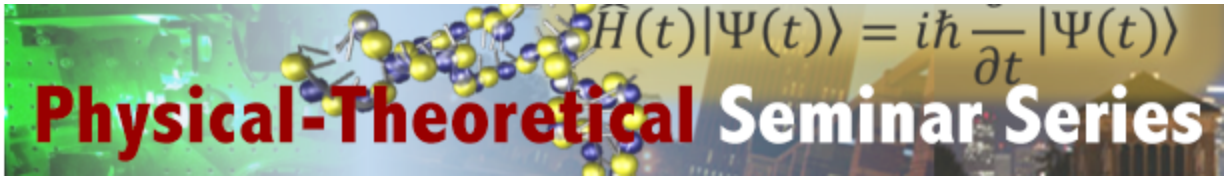

Monday, April 8, 2019, 12:00 pm
Seaver Science Library, Room 150
SSC Auditorium next to the library

Professor Sunil Saxena

Department of Chemistry
University of Pittsburgh

Cu^{2+}-ion as an ESR probe of protein/DNA structure

Pulsed-ESR techniques have impacted biophysical research that reliably measure interspin separations in the order of 1.5-16 nm - even in non-crystalline samples - to ultimately provide an “amino-acid-level” picture of structure and structural transitions. This talk will discuss our efforts in developing Cu^{2+}-ion based pulsed-ESR distance methods and illustrate how they were used to understand structure-function relationships. We will describe recent efforts to bind Cu^{2+}-ions site-selectively in proteins and in DNA. In proteins, the spin probe is assembled *in situ* from natural amino acid residues and a metal salt, and requires no post-expression synthetic modification. Initial results show that the resultant Cu^{2+}-probe potentially *provides* distance distributions that are *five times narrower* than the common protein spin label. Therefore, this new approach potentially overcomes the inherent limitation of current technology, which relies on a spin label with a highly flexible side-chain. We describe using this innovation to resolve protein conformation dynamics in human Glutathione S-Transferase. In DNA, the incorporation of a 2,2’-dipicolylamine into DNA creates a nucleotide-independent, site-specific Cu^{2+} binding site within the interior of the DNA helix Cu^{2+}-based distance measurements directly measure the most-probable backbone distance. Together the data demonstrate the utility of Cu^{2+} based distance measurements as a probe of biomolecular structure and function.

Hosted by Professor Susumu Takahashi

The scientific community is invited

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