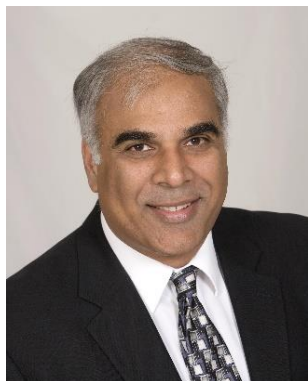


## Prof. Romualdo deSouza

*Indiana University, Bloomington*

**Friday, Sept. 29, 11:00 am. Osborne A204**

### **Exploring the heart of matter with the fusion of neutron-rich nuclei**



Nuclei are fascinating two-component quantum drops at the center of every atom. The stability, and structure of these quantum drops as well as the reactions that they undergo is governed by the interaction of their constituent neutrons and protons. Fusion of two nuclei is a fascinating process in which two strongly-interacting quantum systems merge, lose their individual identity, and assume a new identity. It is a process of interest to the fields of both nuclear physics and nuclear astrophysics. As nuclei become neutron-rich their ground-state nuclear structure changes. How this change in structure influences nuclear fusion is still an open question. Investigation of fusion for an isotopic chain provides a means to address this topic in a systematic fashion and examine the role of pairing. The Indiana University group has developed two complementary techniques to enable measurement of the fusion excitation function with low-intensity radioactive beams. Both techniques utilize the direct detection of fusion products to identify fusion. Using these techniques we have investigated the fusion of  $^{16,17,18,19,20}\text{O} + ^{12}\text{C}$  and  $^{39,41,45,47}\text{K} + ^{36,44}\text{Ar} + ^{28}\text{Si}$  at near barrier energies. Both experimental trends as well as the comparison with theoretical models will be presented.

#### **Short Bio**

Romualdo de Souza received an A.B. degree in Chemistry from Washington University in St. Louis in 1983. His interest in the field of nuclear science stems from these early days and his undergraduate research experience. He completed a Ph.D at the University of Rochester in 1988 and postdoctoral work at the National Superconducting Cyclotron Laboratory (NSCL), Michigan State University (1988-1991). At NSCL he constructed a novel  $4\pi$  detector system for the investigation of nuclear multifragmentation. He joined the faculty at Indiana University as an assistant professor in 1991. Prof. deSouza has diverse research interests ranging from the nuclear equation of state to understanding the process by which elements are formed in supernova explosions. He is a prolific instrument builder and has constructed several novel detector arrays together with their associated electronics. Dr. deSouza was designated an A.P. Sloan Fellow and subsequently a Gill Fellow. His teaching effectiveness was recognized by designating him an SBC/Ameritech Fellow (2002-2003) and awarding him the IU President's Award (1998). In 2008 for his contributions to the field of nuclear chemistry he was awarded the Glenn T. Seaborg national award by the American Chemical Society.