



From Nuts & Bolts to Complex Magnetic Structures: The Making of A High-Performance Neutron Diffractometer At Dhruva Reactor

Dr. Vasudeva Siruguri

Ex-UGC-DAE Consortium for Scientific Research Mumbai Centre, BARC, Mumbai
School of Engineering, Pillai University, New Panvel, Navi Mumbai

ABSTRACT: Way back in 1996, the then Inter University Consortium for DAE Facilities (IUC-DAEF) mooted an idea that the consortium scientists along with experts from BARC and the university community could develop and build a state-of-the-art neutron diffractometer which could support the burgeoning neutron scattering program at BARC and help the neutron scattering user community, especially from the universities across the country. Through discussions with the user community and experts in the field, it was decided that a high-resolution diffractometer could be built. The design of various optical elements and the diffractometer was optimized and validated by carrying out Monte Carlo calculations. The high resolution and high through-put diffractometer finally became operational in 2006 and since then, a number of compounds with complex crystallographic and magnetic structures were studied on this diffractometer. The journey of this diffractometer from the drawing board to a fully functional instrument and some landmark examples of the studies undertaken would be elucidated in this talk.



Dr. Vasudeva Siruguri

Ex-UGC-DAE Consortium for Scientific Research Mumbai Centre, BARC,
Mumbai

School of Engineering, Pillai University, New Panvel, Navi Mumbai

ABOUT THE SPEAKER

Dr. Vasudeva Siruguri, a familiar figure with the neutron scattering community, retired from UGC-DAE Consortium for Scientific Research (UGC-DAE CSR) Mumbai Centre at Bhabha Atomic Research Centre, Mumbai. He completed his PhD from the prestigious University of Hyderabad in the area of amorphous magnetic materials. He joined UGC-DAE CSR at BARC in 1993 and superannuated as its Centre Director in June 2021 after a very successful career in research. Dr. Siruguri helped to develop this institute into a major research centre connecting various universities and academic institutes across the country with large-scale facilities at BARC. He has researched on a wide variety of materials which could be broadly classified as novel magnetic materials like manganites, actinide and rare-earth intermetallics, ferromagnetic shape memory alloys, multiferroics, etc. Dr. Siruguri was one of the lead scientists from the consortium involved in the development, installation and commissioning of a high-resolution neutron diffractometer using focusing optics at the Dhruva reactor, BARC, Mumbai, India. This diffractometer is operational since 2006 with special sample environment of low temperature and high magnetic field. Several university groups use this facility for the study of chemical and magnetic structures. He also worked as a Visiting Scientist at the Basque University in Bilbao, Spain and performed experiments at all the major neutron scattering centres in Europe. He has more than 160 research publications to his credit. Dr. Siruguri is presently working as the Associate Dean, R&D, at the School of Engineering, Pillai University, Panvel.