

Crystallography science in Brazil

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From the beginning of the 70's Crystallography has been an important tool to develop science and technology in Brazilian universities (USP, UNICAMP, UFMG, UFPr, etc.) and research centers (CBPF, IPEN, Petrobras, Inmetro, etc.). These facilities operate X-ray modern table-top sources and setups. In the last three decades, one of the main Brazilian scientific achievements has been the construction and operation of the first synchrotron light source in the southern hemisphere. Since 1996 the Brazilian Synchrotron Light Laboratory (LNLS) offers unique conditions for the use of crystallographic techniques to researchers of Latin America and other foreign countries. The LNLS was the starting point for the Brazilian Center for Research in Energy and Materials (CNPEM) [1], a complex of four world-class laboratories for the development of scientific research. Each of the national laboratories has its own scientific staff and research programs. The LNLS experimental facilities can be accessed by the scientific and industrial communities to conduct structural studies, using more than 16 beamlines. The Brazilian National Biosciences Laboratory (LNBio) was incorporated to the LNLS campus to conduct studies in the areas of Structural Biology, proteomics, genomics, metabolomics, development of genetically modified organisms (GMO), bioinformatics and biological imaging, among other techniques. It recently installed protein crystallization facilities with modern robotic equipment. Important results on the ZIKV infection were recently reported [2]. The Brazilian Nanotechnology National Laboratory (LNNano) offers access to a number of powerful electron and scanning probe microscopes. Visiting researchers are encouraged to use the equipment themselves, trained by expert LNNano staff. New capabilities, such as the cryo-electron microscopy are typically made available to internal users first, while nano- and bio-scientists have the opportunity to analyze their samples using a variety of techniques. The Brazilian Bioethanol Science and Technology Laboratory (CTBE) offers research facilities to help establish Brazil as a leader in the production of bioethanol from sugar cane. CTBE houses a pilot production facility with six multipurpose units to enable researchers to investigate different stages of the production process [3]. Sirius, the new Brazilian Synchrotron Light Source [1] is under construction and it will be the largest and most complex scientific infrastructure ever built in the country and one of the first fourth-generation synchrotron light sources of the world. It is planned to put Brazil on the leading position in the production of synchrotron light and is designed to be the brightest of all the large installations in its energy class. It is predicted to be in operation at the end of 2019.

[1] <http://lnls.cnpem.br/en/> and <http://lnls.cnpem.br/en/sirius-en/>

[2] Xavier-Neto J et al. (2017). PLoS 11(2): e0005363.

[3] Galdos M et al. (2013). Applied Energy 10, 576-82.

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