Today, in an world ever more competitive scientifically and technologically, deep knowledge of materials properties is fundamental

























We need to obtain information about materials and processes at the atomic level, and in real operating conditions is special tools are needed













Neutron Scattering Center

National Laboratories

- Possess unique instruments and facilities
- Address critical scientific challenges with a multidisciplinary approach
- Places an emphasis on translating basic science to innovation.









Argonne's major

scientific user facilities







CNPEM is a private nonprofit organization working under contract with the Brazilian Ministry of Science, Technology, Innovation and Communication











OPEN-ACESS FACILITIES











UVX – Current Brazilian Synchrotron

22 2 22

LNLS – A pioneering lab in Brazil

First synchrotron light source in the southern hemisphere

Still the only one in Latin America

Built between 1987-1997

Around 85% built in house











Synchrotron Light Sources → Transversal Unique Tool for Analysis of Materials

Synchrotron Light Sources

Changed the level/quality of materials research, organic and inorganic











What makes a good light source? High Brightness

- Intense
- Small and collimated source

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NPEM



Example of Impact– Protein (Macromolecular) Structures





V. Ramakrishnan; T. A. Steitz; Ada E. Yonath Chemistry Nobel Prize – 2009 "for studies of the structure and function of the ribosome"



Molecular superstructures



Robert J. Lefkowitz; Brian K. Kobilka Chemistry Nobel Prize – 2012 "for studies of G-protein-coupled receptors"



Membrane proteins





GREAT CHALLENGES OF TODAY AND THE FUTURE

Important and challenging materials and systems are Inhomogeneous, Hierarchic, Composites with distinct spatial and time scales



5D Tomography

Spatial resolution, temporal evolution, chemical resolution Charge-discharge process in Li ion batteries



New Challenges Require New Tools

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NSLS-II (Brookhaven)



Sirius, a state of the art machine









Sophisticated Civil Construction- 68.000 m²







▶<<!><!><!</!>

LININess











Highly Complex Equipments Accelerators

Accelerators Tunnel







Beamlines







СИРЕШ

















Brazilian Suppliers

Continuous interaction with many Brazilian companies in order to find developers as well as suppliers for production

~ 85% expenditures in Brazil







PÁTRIA AMADA BRASIL Construction of all electromagnets for the booster and storage ring





Large Brazilian Company





Cooperation Generating New Technology New Markets New Culture

> 1000 electromagnetsHigh Precision and Stability







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X-Ray Detectors



+10 companies and research centers involved

lauquen







Software and wire-bonding Flex PCB High precision machining Circuit boards









Detector Backend – Local HPC for on-flight tomography data processing and rendering









Synchrotron utilization by many industrial sectors Distinct modes of collaboration



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National Laboratories Strategic Environments



ΝΡΕΠ

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