The Pan African Conference on Crystallography (PCCR2)
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Cooperative Brilliance

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Elettra is one of the first 3rd generation storage rings, successfully upgraded to routinely operate in top-up mode at both 2.0 and 2.4 GeV. The former Linear Accelerator injector has been completely rebuilt as a new FEL source, FERMI, developed to provide fully coherent ultrashort (10-100 femtosecond) pulses with a peak brightness ten billion times higher than that made available by third-generation light sources in the ultraviolet and soft x-ray range.
Elettra hosts four dedicated beamlines for crystallography, two open to the users and two under construction, and expected to be ready for public use in 2015. In service since 1994, XRD1 is a general purpose diffraction beamline. The light source for this wide (4-21 keV) energy range beamline is a permanent magnet wiggler. XRD1 covers experiments ranging from grazing incidence X-ray diffraction to macromolecular crystallography, from industrial applications of powder diffraction to X-ray phasing with long wavelengths. The bending magnet powder diffraction beamline MCX has been open to users since 2009, with a focus on microstructural investigations and studies under non-ambient conditions. A superconducting wiggler delivers a high photon flux to a new fully automated beamline dedicated to macromolecular crystallography and to a branch beamline hosting a high pressure powder X-ray diffraction station (both currently under construction). A high throughput crystallization platform equipped with an imaging system for the remote viewing, evaluation and scoring of the macromolecular crystallization experiments, has also been established and is open to the user community.
Synchrotron radiation science owes its success to its impact in the science of materials considered in the widest sense, where high quality performance experiments require high quality beamline instrumentation. The challenges for beamline engineering, from managing high heat loads to the development high stability optics, to are common to all of the light sources. Therefore, the development of a new beamline necessarily implies the set-up of collaborative structures that involve a broad expanse over the synchrotron radiation community. As a matter of fact, all beamlines include common elements such as X-ray optics, experimental stations, detectors and beamline control so that the collaborative development of common technology platforms has proven crucial in enabling the community to handle sophisticated instrumentation whilst still allowing customization to particular user and experiment demands.

Primary author: Dr LAUSI, Andrea (Elettra Sincrotrone Trieste)

Presenter: Dr LAUSI, Andrea (Elettra Sincrotrone Trieste)

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