NINA: The ESRF Upgrade Beamline for Nano-imaging and Nano-analysis

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In the framework of the Upgrade Programme the ESRF will develop eight completely new beamlines. The upgrade beamline UPBL4 NINA (Nano-Imaging and Nano-Analysis) is the main nanoscopy project. It is driven by research areas with the largest scientific and societal impact: bio-medical studies, earth and environmental sciences, and nanotechnology. It will be a long, high brilliance beamline providing nano-focused beams for analytical imaging. The proposed design overcomes today’s limitations to meet the growing user demand and the requirement for improved spatial resolutions. Based on a canted undulator solution, it operates two independent and distinct branches:

The \textbf{NI end-station (Nano-Imaging)} will mainly address problems in biology, biomedicine and nano-technology. It is optimized for high-resolution quantitative 3D imaging techniques with a specific focus on X-ray fluorescence and projection microscopy. This branch will be optimized for ultimate hard X-ray focusing of a beam with a large energy bandwidth at specific energies. Aiming at life science applications, it will operate in a cryo-environment.

The \textbf{NA end-station (Nano-Analysis)} is a nanoprobe optimized for photon-in/photon-out spectroscopic applications, including EXAFS, XANES and XEOL. It will offer a multi-modal approach (spectroscopy - diffraction - imaging) capable of in-situ experiments. In a complementary way to the NI end-station, NA will provide a monochromatic beam tunable in a large energy range (5 – 70 keV).

We will present selected applications of the ID22NI nano-imaging station \cite{1-3}, the pilot project for this new beamline. Consecutively, we will present the scientific case \cite{4}, the expected performance and the design of the NINA beamline and instrumentation.

References: