

The FERMI@Elettra beamlines: From diagnostics to microfocusing

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The FERMI@Elettra free electron laser (FEL) user facility is currently under construction at the Sincrotrone Trieste laboratory in Trieste (Italy). It will cover the wavelength range from 100 to about 3 nm (by using higher harmonics). In this presentation we will report the layout of the photon beam diagnostics section, the radiation transport system to the experimental area, and the experimental hall. A particular emphasis will be given to the refocusing section involving the use of multi-actuators active elliptical mirrors in Kirkpatrick-Baez configuration.

Due to the peculiar characteristics of the emitted FEL radiation (high peak power, short pulse length, statistical variation of the emitted intensity and distribution) the realization of the diagnostics system is particularly challenging. The final users are interested in parameters like the radiation pulse intensity and spectral distribution, as well as in the possibility to control the intensity. In order to accomplish these tasks a Photon Analysis, Delivery, and Reduction System (PADReS) is now under development and construction, and will be presented here. This system will work on-line producing pulse-resolved information, and will let users have under control the photon beam parameters during the experiments.

The Active optics involved into the refocusing section will use a hybrid system made by standard stepping motors and piezo actuators. The preliminary results show a very good stability and large range of focal distance variation. Those mirrors have to produce a very large demagnification as well as a collimated beam. A brief description of the proposed experiments will be also shown.

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