

SISSI

A new IR beamline at ELETTRA

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Nowadays, several infrared synchrotron radiation (IRSR) beamlines have been built on third-generation synchrotron, and many others are under test or commissioning. The beamline SISSI (Source for Imaging and Spectroscopical Studies in the Infrared), has been projected and realized to work on an exit port ELETTRA. We present a detailed study on the infrared source in term of conventional dipole emission (DE) as well as dipole edge emission (DEE), being both properties significant for this beamline. The optical design of the infrared beamline, including evaluation of the tolerance on mirrors parameter and thermal effects, is also presented. On the basis of the IRSR features and taking into account the optics of the beamline the principal figures of merit, i.e. the Brilliance Ratio and the Polarization Degree, have been evaluated by numerical simulation. We demonstrate that, even if third-generation synchrotron are not optimized for the collection of radiation in the infrared region, the beamline SISSI is suitable for experiments requiring high flux, brilliance and polarized light.

A few scientific cases will be also discussed for a future scientific program. Typical applications of infrared synchrotron radiation in the field of solid state physics will be shown, with particular emphasis to high-temperature-superconductor experiments and high-pressure measurements with diamond anvil cell. Biological and environmental use of IRSR at SISSI will be also discussed.

A.Nucara, S. Lupi and P. Calvani, Review of Scientific Instruments, 74, 3934, (2003).

S. Lupi, A. Nucara, P. Calvani and M. Ferianis, Synch. Rad. News, 14,319, (2001).