Design and Performance of the Infrared Beam Ports at the Canadian Light Source.

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The Canadian Light Source, Inc. is designing and building facilities for Infrared Spectroscopy. Two types of beamlines covering the Mid- and Far-Infrared are planned [1]. One will supply light to commercial Fourier Transform Infrared (FTIR) spectrometers and microscopes for biological and industrial applications. The second will use a vacuum FTIR spectrometer and user-specific experimental attachments. The Mid-Infrared beamlines cover 2 to 25 micron wavelengths while the Far-Infrared beamline provides wavelengths beyond 25 micron. Flux and brilliance (brightness) curves for the Infrared beam lines are reported. The calculations are made to provide working values for the design, construction, and evaluation of the beamlines. Tailoring the bending magnet port size to the wavelength region of interest improves the expected performance for the Mid- and Far-Infrared. Obtaining aperture dimensions aids design of the dipole vacuum chamber and in-vacuum mirror mounts. A comparison to several Infrared beamlines in operation and to a standard thermal source is made to gauge performance. Dipole bending magnet radiation is the basis for comparison. Values obtained using standard bend radiation formulas are compared with values obtained using SRW, Synchrotron Radiation Workshop [2]. Port geometry for attaining this performance and requirements for the first optical element design is discussed.

References


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