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Using metallic filters in APS undulator beamlines

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Metallic filters are needed by APS users in their beamlines. Two general areas of use for the white-beam metallic filters are (1) to attenuate the x-ray beam to reduce the thermal load during routine operations and (2) to attenuate the x-ray beam during alignment and for special testing of optics at low power.

Metallic filters are important for users who will be working primarily in the high energy x-ray range, because unwanted lower energy photons are absorbed through the metallic filters. Notwithstanding their high thermal conductivities, the metals, in general, absorb x-rays significantly near surface layers and hence can attain very large temperatures causing structural deformations and/or damage. Thermomechanical calculations need to be done carefully. In this paper, particulars of metallic filters are discussed and gener-alized analytical solutions are offered to help users of metal-lic filters determine their applicability for x-ray beamlines.

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