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Design of the white-beam transport for insertion device beamlines at the Advanced Photon Source

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To evaluate the feasibility of designing an economic beamline transport system for insertion device beamlines at the Advanced Photon Source, two sample cases have been designed and analyzed, one for an undulator source and the other for a wiggler source. The results show that it is possible to build a 70-meter-long beamline transport system for an undulator source with less than four lead/heavy-metal bremsstrahlung collimators. Six or fewer collimators are needed to construct a 70-meter-long white-beam transport system for a wiggler source.

To prevent damage from any missteered powerful white beam, a water-cooled fixed mask is placed in front of each collimator. Ray tracing for both bremsstrahlung and synchrotron radiation have been conducted for the sample transports. General layout designs and ray-tracing results are presented.

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