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Brilliance and flux reductions in imperfect inclined crystals

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The inclined crystal geometry has been suggested as a method of reducing the surface absorbed power density of high-heat-load monochromators for third-generation synch-rotron radiation sources. Computer simulations have shown that if the crystals are perfectly aligned and have no strains then the diffraction properties of a pair of inclined crystals are very similar to a pair of conventional flat crystals with only subtle effects differentiating the two configurations. However, if the crystals are strained, these subtle differences in the behavior of inclined crystals can result in large beam diver-gences causing brilliance and flux losses. In this manuscript we elaborate on these issues and estimate potential brilliance and flux losses from strained inclined crystals at the APS.

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