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Power Incident on the ILC Helical Undulator Walls

The positron source of the International Linear Collider (ILC) is based on a superconducting helical undulator passed by the high-energy electron beam to generate photons which hit a conversion target. Since the photons are circularly polarised the resulting positron beam is longitudinally polarised. The power deposition in the undulator walls should be below the acceptable limit of 1 W/m since it is a superconducting undulator and also to fulfill the vacuum requirements. The power deposition of the photon beam in undulator walls was studied and shown that the peak power deposition in the undulator walls is above 20 W/m. To keep the power deposition below the acceptable limit, 22 photon masks must be inserted in the undulator line. In this paper the design of photon masks for an ideal and realistic helical undulator is presented. Furthermore, the effect of adding photon masks on the photon power and polarisation (\otimes) at the target plane is discussed.

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