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Development of a Beam Profile Monitor Using Parametric X-ray Radiation

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We propose two new methods (local and remote methods) of measuring electron beam profiles using parametric X-ray radiation (PXR). For the local method, we have demonstrated a proof-of-principle experiment, in good agreement with the results obtained with an ordinary method using a fluorescent screen. For the remote method, we have proposed to use Fresnel zone plates (FZPs) as X-ray lenses. As a first step, the experiments on PXR focusing using a single FZP are in progress at the SAGA Light Source. The proposed methods may be useful for recent advanced accelerators where the bunch length of the electron beam is too short or the beam size is too small.

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