

# Coherent OTR as a Tool for Transverse Bunch Size Measurements

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Optical Transition Radiation (OTR) is widely used for transverse beam profile diagnostics at electron linear accelerators. But this technique may not be implemented for FEL's[1] or LWPA accelerators[2], the reason is that such machines have ultrashort bunches causing coherent effects in the OTR emission process[3]. An approach to calculate the coherent OTR (COTR) propagation through a standard optical system with a focusing lens has been developed. COTR image of the bunch profile is obtained by the summation of the OTR fields coherently emitted by all electrons from a bunch and then focused in the detector plane. Assuming the bunch transverse profile is a Gaussian type it was shown that the final image has a typical "ring" shape. The characteristics of such image depend on the bunch transverse size and can be determined from the COTR image measurement for known optical system parameters.

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## References

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