OPTICAL DIAGNOSTIC FOR OFF-AXIS ELECTRONS IN A LASER WAKEFIELD ACCELERATOR

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Abstract

Theoretical work* on electro-optic shock produced from the interaction of intense laser radiation with ~1% critical plasma suggests that second harmonic radiation will be emitted at the Cherenkov angle. This radiation pattern is produced under similar conditions as when off-axis electrons** were observed. These electrons are of particular interest since they are well suited for external injection into a laser wakefield acceleration structure. Recent experimental results at the U.S. Naval Research Laboratory, using a 10 TW, 50 fs, Ti-Sapphire laser, have shown the existence of such a second harmonic ring. Characterization of this optical radiation and its relationship to off-axis electrons will be presented.

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** D. Kaganovich *et al.*, Phys. Rev. Lett. 100, 215002 (2008).

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