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Measuring the betatron x-ray source size from a laser-wakefield accelerator[1] PAUL CAMPBELL, BRADLEY POLLOCK, ALETHIA BARNWELL, NICHOLAS CHAVES, Lawrence Livermore National Laboratory, JESSICA SHAW, KEN MARSH, CHRIS CLAYTON, UCLA, JOSEPH RALPH, ARTHUR PAK, DAVID ALESSI, YU HSIN CHEN, CHAN JOSHI, SIGFRIED GLENZER, FELICIE ALBERT, Lawrence Livermore National Laboratory — We have performed experiments using the 200 TW Callisto laser system at LLNL to produce GeV-class electron beams and keV Betatron x-rays. The laser was focused into various gas cells with sizes ranging from 3 to 10 mm that contained a mixture of gases (He, N, Ar). We determined the betatron x-ray source size using a computer model and experimental observations of straight edge Fresnel diffraction. Experimental results are benchmarked against a code that solves the equation of motion of electrons oscillating in the plasma wake and by calculating the corresponding x-ray radiation spectrum and profile.

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