

Abstract Submitted
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Measurements of the Correlation between Plasma Bubble Dynamics and Electron Trapping in a Laser Wakefield Accelerator¹ DMITRI KAGANOVICH, Naval Research Laboratory, MICHAEL HELLE, Department of Physics, Georgetown University, Washington, DC, DANIEL GORDON, ANTONIO TING, Naval Research Laboratory — Generation of conically emitted second harmonic radiation has recently been observed in a laser wakefield accelerator experiment at the Naval Research Laboratory. This second harmonic is the result of frequency mixing within the sheath surrounding a fully cavitated plasma region, “plasma bubble,” created by the pondermotive force of a laser. Using this second harmonic signature, we have indirectly studied the dynamics of a plasma bubble. It has been observed that the plasma bubble dynamics are strongly correlated to the generation of electrons. Specifically, the onset of the bubble is connected to the generation of off-axis electrons, while forward accelerated electrons have been observed when the conical distribution of second harmonic is broken, signifying the disruption of the plasma bubble. Further results on bubble dynamics and its connection to electron beam production will be presented.

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