Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

High-Gradient Photonic Bandgap (PBG) Accelerator Structure Breakdown Testing[1] BRIAN MUNROE, MICHAEL SHAPIRO, RICHARD TEMKIN, Massachusetts Inst of Tech-MIT, ROARK MARSH, Lawrence Livermore National Laboratory, VALERY DOLGASHEV, SAMI TANTAWI, ANAHID YEREMIAN, SLAC — Photonic bandagp (PBG) accelerator structures provide unique insight into the surface physics involved in vacuum breakdown in accelerator structures because of their unique surface E and H fields. Peak operating gradients in accelerator structures are limited by surface breakdowns. These breakdowns occur at regions of high surface E and H fields. The maximum surface H field can easily be varied relative to the peak surface E field and accelerating gradient in PBG structures, allowing new regimes of parameter space to be explored. A standing wave PBG structure utilizing elliptical rods at the highest field locations has been tested at SLAC to determine the breakdown properties of the structure under high-gradient operation. The structure achieved a maximum gradient of approximately 125 MV/m at a breakdown probability of $3.6 * 10^{-3}$ per pulse per meter for 150 ns pulses. This performance is comparable to conventional disc-loaded waveguide accelerator structures, but in a structure that provides intrinsic damping of wakefields.

[1]Work supported by DOE-HEP under Contract No. DE-FG02-91ER40648

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Date submitted: 13 Jul 2012 Electronic form version 1.4