Abstract Submitted
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Advancing the extreme field frontier using nanostructure nanoplasmonic modes far beyond gaseous plasmas AAKASH SAHAI, MARK GOLKOWSKI, University of Colorado Denver, JAVIER RESTA-LOPEZ, Cockcroft Institute, UK and University of Valencia, Spain, ANDREA LATINA, CERN, ALEXANDER THOMAS, University of Michigan, THOMAS KATSOULEAS, University of Connecticut, CHAN JOSHI, UCLA, FRANK ZIMMERMANN, CERN, PETER TABOREK, University of California Irvine, RODNEY RUOFF, IBS CMCM Center and UNIST, S. Korea, NANO2WA COLLABORATION — Nonlinear nanoplasmonic modes in nanostructures are modeled to open a new extreme field frontier with access to tens of TeraVolts per meter electromagnetic fields [1,2]. This offers novel pathways in physics of extreme fields particularly with applications in particle acceleration, light sources and nonlinear QED [3,4]. Particle beams interacting with nanomaterials with vacuum-like core regions experience minimal disruptive effects such as filamentation and collisions, whereas the nonlinear surface crunch-in plasmonic modes driven by these beams sustain tens of TV/m electromagnetic fields. Using our recently proposed SLAC experiment [5] which uses charged particle beams to excite unprecedentedly high-amplitude nanoplasmonic modes our nano^{2}WA collaboration seeks to prototype this transformative possibility. Experimental verification will open new possibilities far beyond the tried and tested gaseous plasma mode techniques which is currently considered to be the frontier in high-field physics. [1] arxiv.org/2004.09452 [2] doi.org/10.1142/S0217751X19430097 [3] https://indico.fnal.gov/event/19478/contributions/52561/ [4] https://indico.cern.ch/event/867535/contribution/3716404/ [5] https://facet.slac.stanford.edu/proposals/pac2020-agenda

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