

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Probing the Boiling Point of the Vacuum of Quantum Electrodynamics at the EU.XFEL ISHAY POMERANTZ, Tel Aviv University, LUXE AT THE EUROPEAN XFEL COLLABORATION — LUXE (Laser Und XFEL Experiment), is an experiment planned to be installed in Hamburg using the high-quality and high-energy beam of the European XFEL and a powerful laser. The scientific objective of the experiment is to study quantum electrodynamics in the regime of strong fields, close to and beyond the Schwinger critical field. Within a strong electromagnetic field, the vacuum itself is expected become unstable and spark with spontaneous creation of electron-positron pairs. This experimentally largely untested regime is relevant to a variety of phenomena in Nature, e.g. in the areas of astrophysics, collider physics or atomic physics. It is anticipated with the planned setup that the LUXE experiment will access values three times larger than the critical field, and pioneer this regime of quantum physics. I will report on the science case and the experimental setup, which requires in particular modifications to the European XFEL accelerator complex, the installation of a powerful laser with sophisticated diagnostics, and an array of precision detectors optimized to measure electrons, positrons and photons.

Ishay Pomerantz
Tel Aviv University

Date submitted: 28 Aug 2019

Electronic form version 1.4