Contribution ID: **67**   Type: **Poster**

Track reconstruction using quantum algorithms at LUXE

LUXE (Laser Und XFEL Experiment) is a proposed experiment at DESY and European XFEL in Hamburg aiming to study non-perturbative quantum electrodynamics (QED) in electron-laser and photon-laser collisions. One of the key measurements is the number of positrons produced via the non-linear Breit-Wheeler process, which can be as high as 70,000 at LUXE phase-0 and even higher at phase-1. A silicon pixel tracking detector with four layers and an active area of 54x1.5 cm2 per layer is used to measure the positrons. Precision tracking of positrons becomes very challenging for classical computers due to the high rates. In this poster, I will present the use of quantum algorithms for tracking in a high-density environment, and compare the track finding efficiency and fake rate with classical methods using Graph Neural Networks or a Combinatorial Kalman Filter.

Email Address of submitter

yee.chinn.yap@desy.de

Short summary of your poster content

Poster printing

Yes

Primary authors: KROPF, Annabel (DESY Hamburg); CRIPPA, Arianna; HEINEMANN, Beate (DESY and University of Freiburg (Germany)); TÜYSÜZ, Cenk (DESY); SPATARO, David (DESY); MELONI, Federico (Deutsches Elektronen-Synchrotron (DE)); JANSEN, Karl (DESY); FUNCKE, Lena (University of Bonn); KUEHN, Stefan (Deutsches Elektronen-Synchrotron DESY); HARTUNG, Tobias (University of Bath and The Cyprus Institute); YAP, Yee Chinn (Deutsches Elektronen-Synchrotron (DE))

Presenter: SPATARO, David (DESY)

Session Classification: Networking cocktail and Poster Session