EUROPEAN NETWORK FOR NOVEL ACCELERATORS
EuroNNAc4
NPACT supported by EU via I-FAST

Contribution ID: **23** Type: **Poster (student)**

Alternating phase focusing and approaching large net energy gain in photonic chip-based particle acceleration

Tuesday, 20 September 2022 19:20 (1 hour)

Building small scale particle accelerators on a photonic chip may lead to revolutionary applications of particle accelerators, including new minimally invasive beam irradiation tools for physicians. All individual elements required for particle accelerators on a chip have been demonstrated, but a beam confinement scheme matched to the nano- and micrometer size was needed. By alternately focusing and defocusing the electrons in the transverse and longitudinal directions, the alternating phase focusing (APF) allows, in principle, lossless transport over extended distances [1]. In accordance with particle tracking predictions, we have experimentally demonstrated this low-loss electron transport through a silicon-based nanostructure measuring 77.7 micrometers in length [2,3]. On this poster, we show these results and the current status of the experiment to demonstrate particle acceleration over extended distances and with a significant energy gain.
[1] Niedermayer, U., Egenolf, T., Boine-Frankenheim, O., Hommelhoff, P., Phys. Rev. Lett. 121, 214801 (2018).
[2] Shiloh, R., Illmer, J., Chlouba, T., Yousefi, P., Schönenberger, N., Niedermayer, U., Mittelbach, A., Hommelhoff, P., Nature 597, 498–502 (2021).
[3] Shiloh, R., Chlouba, T., Hommelhoff, P., Journal of Vacuum Science & Technology B 40, 010602 (2022).

Primary author: Ms KRAUS, Stefanie (Chair of laserphysics (FAU))

Co-authors: HOMMELHOFF, Peter (University of Erlangen and Max Planck Institute of Quantum Optics); Dr CHLOUBA, Tomas (Friedrich-Alexander University); BRUECKNER, Leon (Friedrich-Alexander University); Dr SHILOH, Roy (Friedrich-Alexander University); ILLMER, Johannes (Chair for Laserphysics, FAU)

Presenter: Ms KRAUS, Stefanie (Chair of laserphysics (FAU))

Session Classification: Poster Session