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## ACHIP experiments at the ARES linac

*Wednesday, 9 November 2022 14:00 (30 minutes)*

ARES is a linear particle accelerator at Deutsches Elektronen-Synchrotron DESY capable of producing high-quality, low-emittance electron beams dedicated to accelerator research and development. As an introduction we will present the achieved and projected performance of the ARES linac. An overview of the research activities on ultra-short electron bunch diagnostic methods, electron imaging and beam manipulation will be given.

The focus of this contribution will be the dielectric laser acceleration (DLA) campaign in the framework of the Accelerator on aCHip International Program (ACHIP) funded by Gordon and Betty Moore Foundation at ARES. We are employing a 2.05 $\mu\text{m}$  wavelength Ho:YLF laser amplifier system to drive fused silica microstructures with the same periodicity manufactured by our collaborators at Stanford University. The goal of the experimental campaign is the improvement of transmitted charge compared to previous experiments while maintaining the acceleration gradient in the  $\text{GV}/\text{m}$  regime. Also, the ARES linac is foreseen to produce electron bunches exhibiting bunch lengths of less than 2fs, short enough to fit an acceleration bucket at the aforementioned wavelength, which corresponds to 6.8fs period. The arrival time jitter of the electrons at the interaction point will be larger than the laser period. To mitigate this a micro-bunching scheme was developed to synchronize a micro-bunch train with the DLA interaction. We will present the status and the recent achievements of the ACHIP DLA campaign.

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