Contribution ID: **18** Type: **not specified**

Distributed Coupling Linac for Efficient Acceleration of High Charge Electron Bunches

Monday, 18 July 2022 19:00 (20 minutes)

The Electron Ion Collider requires a pre-injector linac to accelerate large electron bunches from 4 MeV up to 400 MeV over 35 m[1]. Currently this linac is being designed with 3 m long traveling wave structures, which provide a gradient of 16 MV/m. We propose the use of a 1 m distributed coupling design as a potential alternative and future upgrade path to this design. Distributed coupling allows power to be fed into each cavity directly via a waveguide manifold, avoiding on-axis coupling[2]. A distributed coupling structure at S-band was designed to optimize for shunt impedance and large aperture size. This design provides greater efficiency, thereby lowering the number of klystrons required to power the full linac. In addition, particle tracking analysis shows that this linac maintains lower emittance as bunch charge increases to 14 nC and wakefields become more prevalent. We present the design of this distributed coupling structure, as well as progress on structure manufacturing and characterization.

[1] F. Willeke, "Electron ion collider conceptual design report 2021," tech. rep., United States, 2021.
[2] S. Tantawi et al., Phys. Rev. Accel. Beams, vol. 23, p. 092001, Sep 2020

In-person or Virtual?

In-person

Primary author: DHAR, Ankur (SLAC National Accelerator Lab)

Co-authors: HAASE, Andrew (SLAC); SY, Ann (SLAC National Accelerator Lab); NANNI, Emilio (SLAC National Accelerator Laboratory); WHITE, Glen (SLAC National Accelerator Lab); BAI, Mei (SLAC); OTHMAN, Mohamed; TANTAWI, Sami (SLAC National Acelerator Laboratory); LI, Zenghai (SLAC)

Presenter: DHAR, Ankur (SLAC National Accelerator Lab)

Session Classification: Poster Session