

# ICFA Mini Workshop on Higher Order Modes in Superconducting Cavities (HOMSC2018)

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## Overview of CBETA and the role of HOMs

*Monday, 1 October 2018 11:30 (30 minutes)*

CBETA, the Cornell-BNL ERL Test Accelerator that is currently being constructed at Cornell University combines several forefront accelerator components to a prototyping facility for the Electron-Ion Collider, the US' next large particle accelerator project. CBETA uses a high-brightness photo-emitter electron source and a high power SRF linac to inject a CW electron beam into a 4-turn ERL. The SRF linac in the ERL loop is optimized for large beam current but little coupler power, and the return loop is constructed with an Fixed Field Alternating-Gradient (FFA) lattice of permanent Halbach magnets, which allows to store the 4 beam energies simultaneously in one return loop.

Because the ERL linac uses the deceleration of the beam as a power source for new bunches, the current is not limited by the power provided to the ERL linac. The new current limits are entirely due to HOMs: heating and the Beam-Break-Up (BBU) instability. Care is therefore taken that HOM absorption is well controlled and that HOMs are not driving beam instabilities.

**Primary author:** Prof. HOFFSTAETTER, Georg (Cornell University)

**Presenter:** Prof. HOFFSTAETTER, Georg (Cornell University)

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