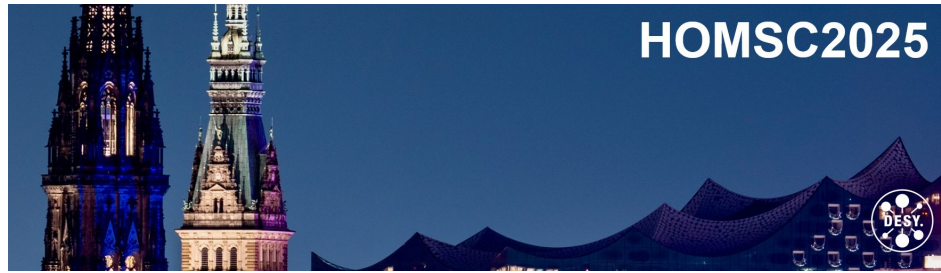


# International Workshop on Higher Order Modes in Superconducting Cavities (HOMSC2025)



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## Progress of HOM couplers for PERLE SRF cavities

*Tuesday 7 October 2025 12:30 (30 minutes)*

The study presented here focuses on the progress of the HOM (High Order Mode) coupler for 5-cell 801.6 MHz elliptical Superconducting RadioFrequency (SRF) cavity designed for PERLE (Powerful Energy Recovery Linac for Experiments), a multi-turn ERL planned to be hosted at IJCLab in Orsay (France). Due to the high operating current and multiple passes of this machine, HOM damping in the SRF cavities is essential to reduce the risk of Beam Breakup (BBU) instabilities and mitigate the cryogenic losses. To limit beam induced HOM effects, several damping schemes were studied and the damping results were compared with the impedance thresholds. The solution adopted consists of two HOOK type HOM couplers installed on the cutoff tubes of the SRF cavities with respect to the first machine configurations that will best provide a 250 MeV electron beam with an intensity of 20 mA. To define and optimize the mechanical design of the coupler, several criteria were considered in order to meet the RF, thermal and manufacturing constraints: the best RF transmission of dangerous trapped HOM modes while guaranteeing a good rejection of the fundamental mode, a reliable cooling system to avoid any overheating and some geometric shapes suitable for the manufacturing.

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