



Contribution ID: 15

Type: **Oral contribution**

Cold Testing and HOM Coupler Qualification for HL-LHC Crab Cavities

Wednesday 8 October 2025 09:30 (30 minutes)

As part of the High Luminosity LHC (HL-LHC) upgrade, crab cavities will be installed near the ATLAS and CMS experiments to mitigate luminosity loss from large crossing angles. To accommodate the differing crossing planes, two compact cavity designs have been developed: the Double Quarter Wave (DQW) resonator and the RF Dipole (RFD) cavity. Both cavity types have been prototyped, built, and tested at 2 K with HOM couplers at the SM18 test facility at CERN.

This presentation focuses on the higher order mode (HOM) couplers installed on both DQW and RFD cavities, specifically their performance as measured during cold tests, with particular attention to the damping of critical modes expected to be driven by the HL-LHC beam. For the RFD cavities in particular, the evolution of HOM characteristics was tracked from dressed cavity measurements through full cryomodule integration and testing.

In parallel, the specially designed $25\,\Omega$ RF transmission lines—including flexible cables, impedance adapters, and rigid RF lines—were qualified to ensure reliable operation of the HOM coupler system within the cryomodule environment.

Primary author: EDWARDS, Amelia Veronica (CERN)

Co-author: CALAGA, Rama (CERN)

Presenter: EDWARDS, Amelia Veronica (CERN)

Session Classification: Operation of SRF Facilities

Track Classification: Operation of SRF Facilities