

HOM Damping in Accelerating Cavities with Large Number of Cells: Application to 44-Cell TWCs of CERN SPS

Wednesday, 3 October 2018 11:00 (30 minutes)

Extensive beam dynamic studies conducted in the framework of LIU (LHC Injectors Upgrade) project revealed a serious intensity limitation due to HOMs of the 200 MHz travelling wave cavities (TWCs) of SPS in the frequency range of 629-630 MHz. However, finding appropriate distributed damping scheme in cavities with large number of cells (like TWCs of SPS) usually accompanied with the following challenges: 1. each passband supports as many EM modes as the number of cells, 2. relatively low R/Qs can result in large beam coupling impedances due to the high Q of the cavity, and 3. The already rich nature of modes (in some cavities in addition to different TE and TM modes various type of hybrid modes can be supported) varies when other sources of perturbation (FPCs and other HOM damping scheme) are added to the multi-cell cavity. In this presentation, an approach for designing a distributed damping scheme for multi cell cavities will be presented. The effectiveness of the proposed damping scheme is examined through both simulations and measurement results on the 44 cell travelling wave cavities of CERN SPS.

Primary author: Dr NASRESFAHANI, Nasrin (Beams Department, RF Group, Beams and RF Studies Section)

Presenter: Dr NASRESFAHANI, Nasrin (Beams Department, RF Group, Beams and RF Studies Section)

Session Classification: Design of SRF Cavities and HOM Damping Schemes