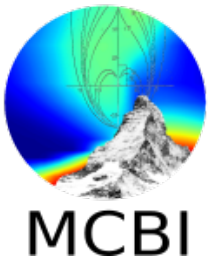

Contribution ID: **102** Type: **not specified**

* Metamaterial-based absorbers for the mitigation of beam coupling impedance effects

Tuesday 24 September 2019 19:40 (10 minutes)

Resistive-wall impedance constitutes a significant percentage of the total beam-coupling impedance budget of an accelerator. A number of different reduction techniques have been proposed during the years depending on the specific applications, ranging from higher order modes damping to solutions entailing high electrical-conductivity coatings of the pipe. This paper investigates the use of metamaterial-based absorbers for sensibly reducing or nearly cancelling resistive-wall impedance. We design and fabricate sub-wavelength two-dimensional metallic resonant structures based on the split ring resonator (SRR) geometry that can be employed as mode dampers in accelerating structures. A number of prototypes are fabricated and measured in a "test model"pillbox cavity. Experimental results agree well with full wave electromagnetic simulations and with the constitutive effective parameters of the SRR-based metamaterials retrieved using a numerical analysis. This study opens up to the possibility of considering metamaterials as a valid alternative to other devices for impedance mitigation in experimental setups commonly operating along a particle beam line, such as accelerating cavities or collimators, and more in general for the development of filters with a large out-of-band signal rejection in specific applications.

Authors: MASULLO, maria rosaria (infn); Prof. ANDREONE, Antonello (Physics Department, University of Naples Federico II); VACCARO, Vittorio (Universita e sezione INFN di Napoli (IT)); MASI, Alessandro (CERN); LOSITO, Roberto (CERN); PASSARELLI, Andrea (Universita e sezione INFN di Napoli (IT)); Dr CHIKHI, Nassim (University of Naples, Federico II)

Presenter: MASULLO, maria rosaria (infn)

Session Classification: Poster Session