Contribution ID: **435** Type: **Poster Presentation**

Booster Cavity Damper Redesign for PIP-II

A new Higher Order Mode (HOM) damper was designed and is undergoing testing for the Booster accelerator cavity at Fermilab. In anticipation of the PIP-II upgrade, it was discovered that the higher intensity of PIP-II may cause beam instability due to an excited mode at 106 MHz. This unfortunately corresponds with the cavity's 2nd order harmonic mode, which will sweep from 86-105.7 MHz. The new damper is a modification of an existing damper that was designed to reduce an existing static HOM at 83 MHz, with the new design intending to cover the 2nd order HOM as well. The existing damper uses an inductive coupling loop to extract RF energy from the cavity which then goes through a filter in order to reflect the fundamental frequency back into the cavity while passing HOMs to a dump load. The new damper intends to replace the filter portion of the system with a wider band variant while also changing the topology from a coaxial cable loop filter to a componentized PCB-based design. Primary design challenges include bandwidth coverage, impedance matching of the various modes, long term thermal and mechanical stability, radiation hardness, and high voltage handling. Initial designs achieved the desired damping but were found to quickly succumb to destructive arcing due to the voltages present. More finalized designs intend to address this problem through circuit design modifications as well as the use of hardier components.

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No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

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Yes

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