1.0 LDRD Harmonic Kicker

Principal Investigator: Andrew Kimber (For Ed Nissen)

Project Status

The project has been on hold since the departure of Ed Nissen (now at CERN). Andrew Kimber was designated the Principle Investigator at that time. Schedule pressures from the 12GeV project have meant that zero dollars have been spent thus far (labor and materials).

Project Plan

It has become clear that Engineering resource remains tight for the remainder of FY14. Completing the installation and commissioning of the 12GeV components and systems remains the highest priority. A revised scope of what could be achieved this fiscal year has been considered and is outlined below.

Completing a proof of principle at lower frequencies (or indeed simulating harmonic addition) has already been performed, albeit not optimized. If a realistic simulation (in Microwave studio, or equivalent) of an RF circuit capable of harmonic addition could be completed at the required frequencies, it would go a long way to proving that hardware could be built. Access to Microwave Studio would be needed, as well as a competent operator. These resources have been allocated from the Accelerator Division.

An additional collaboration has been sought with a small group of RF engineers in the Electrical Engineering Division. To improve efficiency in the early design stages, a weekly 1 hour meeting will be held to discuss ideas and progress the project.

The goal of the work this fiscal year (FY14) would be to create a simulation of RF components that could be used to construct hardware at the frequencies required for MEIC. FY15 funds will be used for actual construction.

A proposal for FY15 funds will be submitted to complete the project as originally outlined.

Budget

$ 151.346K- Original awarded LDRD budget for FY14 (loaded)

$ 31.267K - Revised FY14 budget (loaded)
$ 131.002K – Revised budget for FY15 proposal (loaded)
$ 162.268K – Revised total budget (loaded, awarded amount + $ 10.922K)

Estimate of labour for FY14: **$ 31.267 K (47.6% G&A rate)**

Andrew Kimber: 3 weeks, oversight, main design, simulation

Musson/Plawski/Hovater: 1hr/wk each. ~12 weeks, ~6 days of effort, assistance to the design effort - .4 PW for each person

SRF representative (TBD) to drive Microwave Studio: 1 week, simulation

CASA representative (Amy Sy): 3 weeks, replacement for Ed Nissen

Revised proposal for FY15: $ 131.002 (50% G&A rate + procurements)

Pending the outcomes of the simulation study, procurement, construction and test of a system that can produce waveforms from harmonic inputs.

A proof of concept experiment with the SLAC PEP-II stripline kicker with a continuous RF signal.

Measurement of the response of the kicker to this driven signal.

A summary report with direct recommendations and example hardware for the full scale MEIC electron cooler ring fast (RF) kicker concept..

Publications

None

Workshops/Conferences

None