# 1.0 Fast Kicker for the MEIC electron cooler

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## Project Status

Bunch simulation work in Elegant have been carried out and show promising results. The simulations attempt to quantify the uniformity of the kicking pulse over the length of a kicked bunch and subsequent effect in phase space of an inwards kick, multiple turns through a transfer matrix and a final outwards kick. These results suggest that, independent of the cavity technology used, the fundamental principle of the summed waveform is valid and should be pursued further.

A CST time domain simulation and power estimate for a stripline kicker was completed. This study suggests that the SLAC kicker (in its present form) would be too inefficient at the frequencies in question, and would require excessive power to drive the cavity for even a small beam deflection. Although this is not a surprising result, as the SLAC kicker was not designed for the function we require, it gives us a basis for comparison in suggesting the ideal cavity technology moving forward. It also gives us some baseline simulated values that can be verified with the proposed experiment.

The cavity currently on loan from SLAC has been repaired. There were two electrode assemblies that had been damaged in shipping. Several parts had to be remade and re-brazed. The Goubau line experiment has been set up and data will be taken in the coming weeks.

## Project Plan

The remainder of the year will be spent on the following:

1. Further bunch/beam simulation work to reduce the non-uniformity of the kicking pulse and to further quantify the bunch effects of the kicking pulse structure.
2. Perform the bench tests on the recently repaired SLAC cavity. This will give further insight into the best cavity technology that should be recommended for the MEIC kickers.
3. Further work on the design of the driver and amplification electronics. Finalization of electrical parameters required to meet or exceed the bunch simulation work. The aim is to improve the theoretical performance of the suggested system, as well as reduce cost and complexity. It would also be advantageous for the system to remain flexible to changes in bunch timing and structure (1 in $x$ bunches kicked).
4. Final report outlining an example system with recommendations on driver design and cavity technology.

## Budget

Budget: The LDRD staff will provide a graph of budget progress after you submit your report. It will become an appendix to your report, and be on a separate page

## Publications

*N/A*

## Workshops/Conferences

*N/A*