

Proposal No. 1734189

“Program for Development and Demonstration of Pioneering Accelerator Technology”

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Budget Impact Statement:

With the significant reduction in funding levels (Yr1: \$1,250,000; Yr2: \$600,000; Yr3: \$650,000 from Yr1: \$2,780,000; Yr2: \$2,960,000; Yr3: \$2,990,000), the scope of the project will have to be adjusted as summarized in the following. The revised scope follows the recommendations from the Review Panel Summary by focusing on the two highest-ranked research directions (High-Frequency, High-Efficiency Compact SRF Cavities and Optical Stochastic Cooling), while also reducing technician support as much as possible. The remaining three proposed research directions (Energy Recovery Linac Studies at Cornell's CBETA, Beam Research with Photocathodes, and Compact SRF Gun for Cold Beams) will not be supported. Outreach activities would be scaled proportional to the reduction in budget.

Optical Stochastic Cooling: The reduced funding level will be insufficient for a full demonstration of optical stochastic cooling on the 3-year time scale. The revised scope will therefore include: (1) development of the modeling and simulation code (that is essential to the design of CESR lattice, bypass optics, and choice of beam energy); (2) demonstration and characterization of beam dynamics in the storage ring (CESR) operating at the low energy required for the OSC test; (3) design, fabrication, installation and tests of the delay bypass; and (4) measurement of the radiation spectrum from pickup and kicker undulators and interaction of electron beam in kicker undulator with radiation emitted by the pickup. The engineering design of the optical amplifier and its fabrication, installation and testing will be delayed into a possible subsequent funding cycle or until other funding becomes available. Demonstration of cooling will likewise be delayed.

High-Frequency, High-Efficiency Compact SRF Cavities: The advanced high frequency SRF cavity design, prototyping, and performance studies would be conducted as described in the proposal. Fabrication of prototype high-frequency cavities would be reduced from eight to four prototypes of the most promising design, spanning operating frequencies in the 2 to >6 GHz range to accommodate the reduced budget in years 2 and 3, and to reduce technician support.