Jefferson Lab Plan for Submitting Proposals to FY18-19 EIC R&D FOA
Date: December 7, 2017

Topic	Prop. #	Collab.	Cost	Rating
I. Crab cavity operation in a hadron ring				
1. Crab cavity operation in a hadron ring [PIs: G. Krafft (JLab/ODU) and Q. Wu (BNL)] a. Participate in the first test of crab cavity operation in a hadron ring, SPS, at CERN b. Design and simulations of crab crossing, development of crab cavity specifications, and benchmarking them against SPS data c. Design an experimental test of crab crossing in RHIC	1	BNL, ODU, ?		1, High-A
II. Strong hadron cooling				
1. Survey of strong hadron cooling options for an EIC [PIs: Y. Zhang (JLab) and A. Fedotov (BNL)] a. Magnetized bunched beam electron cooling with beams generated by an ERL; do estimates and consider a magnetized cooling test in RHIC b. Bunched beam electron cooling (magnetized/non-magnetized) with beams stored in a low energy electron storage ring c. Coherent Electron cooling using a free electron laser as an amplifier d. Coherent Electron Cooling using microbunching as an amplification scheme e. New ideas of electron cooling f. Study of mechanisms to provide strong cooling indirectly by coupling of the planes of oscillations	2	BNL, ?		3, High-A
2. Complete design and technology demonstration tests of a magnetized ERL-based electron cooler [PI: S. Benson (JLab)] a. Electron cooling simulation development b. Design of critical technologies for ERL-based electron cooler c. Development of a harmonic kicker to enable use of a circulator ring for strong hadron cooling d. SRF systems for an electron cooler e. Electron cooling experiment to benchmark continuous and bunched beam electron cooling simulations	3	?		3, 4, High-A

III. Magnet design				
1. Validation of magnet designs associated with high-acceptance interaction points by prototyping [PIs: T. Michalski (JLab) and B. Parker (BNL)] a. Development of IR magnet specifications for a prototype b. IR magnet design verification c. IR FFQ prototype design	4	BNL, SLAC, ?		5, High-A
2. Complete and test a full scale suitable superferric magnet [PIs: T. Michalski (JLab) and P. McIntyre (TAMU)]	5	TAMU, ?		17, High-B
IV. Benchmarking of EIC simulations				
1. Accurate simulations of beam-beam effects [PIs: Y. Roblin (JLab), Y. Luo (BNL), Y. Hao (MSU), and J. Qiang (LBL)] a. Noise Effects in strong-strong beam-beam simulations b. Quantitative Understanding of the Damping Decrement of the Beam-Beam Performance c. Collider operation with different numbers of electron and hadron bunches d. Design an experimental test of gear change in RHIC e. Beam dynamics with crossing angle and crab cavities f. Beam-beam with space charge effect	6	BNL, ODU, MSU, LBL, ?		4, High-A
2. Experimental verification of spin-tune-0 mode of spin dynamics in an EIC [PIs: V. Morozov (JLab) and H. Huang (BNL)]	7	BNL, ?		4, High-A
V. ***Electron complex***				
1. Operate the JLab CEBAF in the JLEIC injector mode [PI: J. Guo (JLab)]	8	?		22, High-B
2. High-power fast kickers for high bandwidth feedback for the electron collider ring of an EIC [PIs: R. Rimmer (JLab) and K. Smith (BNL)]	9	BNL, ?		19, High-B
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