

**From:** [Pleier, Marc-Andre](#)  
**To:** [Capasso, Frances](#)  
**Cc:** [Begel, Michael](#); [Ma, Hong](#); [Denisov, Dmitri](#)  
**Subject:** Intent to submit a FY2023 LDRD Type A Proposal  
**Date:** Friday, May 27, 2022 12:54:08 PM  
**Attachments:** [image001.png](#)

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Dear Fran,

I intend to submit an LDRD-A proposal as follows:

**Title:** Capturing FCC-ee for BNL

**Abstract:** We propose to establish a program of Higgs coupling studies at the prospective electron-positron Future Circular Collider (FCC-ee) to inform the detector development and optimization at the FCC-ee. The FCC-ee collider design is based on well-established technologies and planned to be constructed in a tunnel of approximately 90 km length around CERN, Geneva, Switzerland. It will enable precision studies at various center-of-mass energies, including Higgs coupling measurements at the sub-percent level and searches for new particles. Our group will be building on well-established ties with CERN through the ATLAS collaboration, where BNL led the US contribution to the original construction and is now the host laboratory, leading operations and detector upgrade programs. Based on the leadership of our group in the corresponding ATLAS analyses and in close collaboration with our expert High Energy Theory, Electronic Detector Group and Nuclear and Particle Physics Software groups, we propose to study

(i) the Higgs decay into two charm quarks,  $H \rightarrow c\bar{c}$ , to measure the couplings of the Higgs boson to charm quarks, using machine learning (ML) techniques developed in the ATLAS analysis of Higgs decays into two W bosons,  
(ii) the coupling of the Higgs boson to itself, and  
(iii) the FCC-ee discovery potential of new, feebly interacting or invisible particles, produced directly in electron-positron collisions or through the Higgs boson decay that could give hints as to physics beyond the Standard Model of particle physics and the nature of dark matter.

The FCC-ee foresees up to four interaction points, and two complementary detector design concepts have been proposed thus far, with a third detector concept just getting started. These detector concepts are still under evolution and still being optimized, with ample space for innovation. Based on our expertise in ATLAS we will study the detector layout and data-acquisition (DAQ) strategy in simulation to maximize the physics performance on the above-mentioned physics analyses. Specific emphasis will be put on the layout and development of tracking and timing detectors, noble-liquid based calorimetry, and on the DAQ architecture. This will ensure no stone will be left unturned at the FCC-ee facility in our quest to enhance our understanding of the universe. Based on our expertise and well-demonstrated leadership in ATLAS, BNL is in a unique position to establish leadership in above research areas. This could enable us to become the host laboratory for a future FCC-ee detector, which will complement the already existing ties of BNL to the FCC in collider- and interaction-region magnet design.

**List of PI's:** Kétévi Assamagan, Michael Begel, Liza Brost, Viviana Cavaliere, Hucheng Chen, Angelo Di Canto, George Iakovidis, Paul Laycock, Marc-André Pleier, Scott Snyder, Robert Szafron, Alessandro Tricoli

**Other BNL organizations involved:** none.

Thanks,  
cheers,  
Marc-André.

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Marc-André Pleier (he/him/his)

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**From:** Capasso, Frances <capasso@bnl.gov>

**Sent:** Monday, May 16, 2022 7:16 AM

**To:** Physics Personnel <PhysicsPersonnel@bnl.gov>; CAD Personnel List <allcad@bnl.gov>

**Subject:** FY2023 LDRD Call for Type A Proposals

To the Members of the Nuclear and Particle Physics Directorate,

Attached is the BNL FY2023 LDRD Call for Type A Proposals with four (4) attachments. In keeping with the guidance, this process will be coordinated through the Office of the NPP ALD to develop, pre-review, and provide feedback before preparation of a full proposal. Prior to the final submittal to the Director's Office by the COB on June 24, 2022, a schedule is provided below with a few items to note so we can have a successful submittal. We expect proposals to be aligned with one or more of eight priority areas outlined in the LDRD Type A call and encourage PI's to contact appropriate POC's to coordinate. This year the NPP quota is submission of four proposals with some proposals potentially split with other organizations. PI's are encouraged to consider cross directorate LDRD Type A proposals where an expanded range of expertise can be utilized to improve proposal strength and potential. Also attached is a template for the NPP proposal pre-review presentation. Please take the time to read attached items and familiarize yourself with the requirements of this LDRD Type A proposal call. As we have done in previous proposal calls, Fran Capasso will provide the coordination of an Indico site that she will share with the group once established and set the timeframes for the presentations.

A few things to note:

This is a call for Type A proposals only.

Please take note of the selection criteria provided in the call to calibrate your work to the scope, duration, size, and funding limits. Type A proposals have a duration limit of 36 Months and a dollar limit of \$500K per year. Any amount larger than this should be discussed with your Department Chair and the NPP ALD.

The PIQ form has been revised, make sure you use the one provided. Pay particular attention to sections 8, 9 and 10. PI's are requested to obtain signatures on the PIQ from the BOM and the Department Chair BEFORE they upload the proposal onto Indico. All proposals should be vetted within your department prior to pre-review.

Proposals that involve cross - directorate work should be identified, and a decision made as to which directorate will submit the proposal.

Schedule:

- May 16, 2022: Details emailed to the Directorate for the NPP LDRD Type A proposals with LDRD Call guidance, and PowerPoint template for the initial proposal pre-review, along with all attachments necessary for the process.
- May 27, 2022: An email should be sent to Fran Capasso of intent to submit a proposal. Please be sure to include a title, abstract, list of PI's and other BNL organizations involved, if any.
- June 1, 2022: A Zoom virtual meeting to pre-review the proposals. A PowerPoint template is attached and should be used.
- June 6, 2022: Feedback will be sent to PI's about proceeding or not toward development of full proposals.
- June 17, 2022: PI's should upload close to final proposals on Indico for the NPP management to review and provide feedback to PI's.
- June 23, 2022: PI's are requested to obtain signatures on the PIQ from the BOM and the Dept Chair BEFORE they upload the final proposal on Indico by noon on June 23<sup>rd</sup>.
- June 24, 2022: Fran Capasso submits for NPP Directorate to the Director's Office.

Thank you,  
Fran

*Fran Capasso*

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