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Quantum Computing Boot Camp

Dear Members of the Selection Committee,

I write to recommend graduate student Phoebe Sharp for acceptance in the 2023 Quantum Computing Boot Camp. Phoebe is finishing her fourth year in the George Washington University PhD program, working on an experimental nuclear physics thesis based on research conducted in Hall D at Jefferson Lab. Though Phoebe is not a theorist, she has always had a strong interest in the theoretical foundations of her work and wants to learn more about the future of QCD calculations, which will no doubt be relevant for her over the course of her career. I have confidence that Phoebe will take full advantage of the opportunities that this Boot Camp will provide.

I became Phoebe's doctoral advisor in the summer of 2020, at the end of Phoebe's first year of graduate school. Phoebe was the first graduate student to join my new group; I could not have gotten luckier. She began working with on simulations to prepare for the Experiment Readiness Review for the upcoming Short-Range Correlations Experiment in Hall D (E12-19-003) and much of this work was time sensitive. This was also Phoebe's first foray into experimental nuclear physics, and rather than be overwhelmed, Phoebe launched herself into the project, taught herself a great deal of both physics and programming from scratch and made superb progress. She first tackled the question of optimizing our experiment's photon beam energy, and showed that making any more than a small reduction would compromised the precision we could achieve. This work went directly into our experiment's "Beam Time Request" document that we prepared for the review. Literally within a few weeks of starting, Phoebe's work was already making a big impact on how our experiment would be conducted.

Phoebe's contributions only accelerated in the build up to the experiment. As she gravitated toward studying  $\rho$ -meson photoproduction for her thesis topic, she worked to add this channel to our experiment's custom Monte Carlo event generator. This required her to make a deep dive into past cross section measurements and calculations, and get her hands "dirty" in the Monte Carlo code. She then used her Monte Carlo to make predictions for the upcoming experiment, and she presented this work at the 2021 DNP Fall Meeting. She also took the initiative to travel to Jefferson Lab multiple times to volunteer with the PrimEx experiment, to become familiar with how Hall D operates and become a fully trained shift expert, in order to hit the ground running at the start of our experiment. Phoebe was more than prepared; she helped ensure a successful data taking over the fall of 2021.

In the past year, Phoebe successfully presented and defended her thesis proposal to our department, and has launched into data analysis. She was awarded a 2022-23 DOE Office of Science Graduate Student Research Fellowship in recognition of her talent and the merits of her proposed project. Currently we are working on a paper in which Phoebe has performed theory calculations using a technique called "Generalized Contact Formalism" to make predictions for several observables related to  $\rho$ -photoproduction from nuclei. In addition to being a strong experimentalist, Phoebe is very willing to engage with theory and to try understand the foundations of how calculations are performed.

I think Phoebe is very eager to participate in this bootcamp because she recognizes how quantum computing will impact the QCD calculations that affect what she chooses to measure, over her career. Phoebe will be an enthusiastic participant and one who will make connections between what she learns and all other areas where she

works. She has my strongest recommendation.

Sincerely,

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Axel Schmidt