

Jefferson Lab, April 29, 2023

Dear Felix, Jianwei, Kostas, Nobuo, Raghav, Raul, and Robert:

I am writing this letter of reference for Phoebe Sharp, a Ph.D. student at George Washington University who has started to work with me on a Quantum Computing project. Phoebe is currently stationed at Jefferson Lab on a DOE Office of Science Graduate Student Research Fellowship. She has expressed her interest in attending the Quantum Computing Boot Camp that you are organizing, and I am pleased to offer my full support for her application.

I have the pleasure of working with Phoebe on a research project exploring the intersection of Quantum Computing and Nuclear and High Energy Physics (NHEP). This project focuses on the co-design of quantum hardware and algorithms, and aims to identify possible classes of applications in NHEP, ranging from quantum process simulation over event classification directly at the quantum level to optimal real-time control of experiments. These types of algorithms are particularly suited for quantum algorithms that involve Variational Quantum Circuits, but might also benefit from more unusual special-purpose techniques like (Gaussian) Boson Sampling. We explore challenges and opportunities in the cross-domain cooperation between Quantum Computing and NHEP, and show routes towards co-designed systems and algorithms. In particular, we aim at furthering the interdisciplinary exchange of ideas by establishing a joint understanding of requirements, limitations and possibilities. Phoebe has shown great enthusiasm and aptitude for this project, despite her minimal experience in Quantum Computing.

In addition to her Ph.D. research in experimental Nuclear Physics, Phoebe has expressed a strong interest in Quantum Computing. She believes that quantum computing is a significant aspect of the future of scientific research in many ways and is keen to improve her understanding of how it works. She sees her interest in quantum computing becoming more relevant in academic spaces, and. The Quantum Computing Boot Camp would be an incredible opportunity to prepare her for future academic success. Phoebe's background in programming, with proficiency in C++ and Scientific Python, is a valuable asset to her research endeavors and aligns well with her interest in the interplay of Nuclear Physics and Scientific Computing. It is also worth noting that Phoebe is scheduled to serve as a scientific secretary at CHEP 2023, which highlights her commitment to advancing her knowledge and involvement in advanced scientific computing research.

Based on Phoebe's dedication, enthusiasm, and strong academic background, I am confident that she would make an excellent participant in the Quantum Computing Boot Camp. I strongly recommend her for this opportunity, and I believe that her participation would be a valuable asset to the program. Please do not hesitate to contact me if you have any further questions or require additional information.

Sincerely,

Markus

Dr. Markus Diefenthaler,
Electron-Ion Collider Staff Scientist