Dear Admission Officer,

Thank you for reading my motivation letter. I am Fan Lu, a senior student of Sun Yat-sen University.

Physics is a practical subject that interprets the world. It can be applied to the explanation of all phenomena in nature, at the same time, it embodies, to the greatest extent, the beauty of rational science. The significance of physics in real life is undoubtedly profound. Looking around, the computer we use relies on the study of semiconductors, the mouse on optics, the desk lamp on electricity, while the air conditioning on thermodynamics. To me, there is a special magic in physics, which constantly attracts me and drives me into deeper study and research in this field.

Ranking top 0.3% in the college entrance examination in Guangdong Province of China, I was admitted into the physics major of Sun Yat-sen University. During the undergraduate years, I have laid a solid theoretical foundation in physics by taking all kinds of specialized courses, including Quantum Mechanics, Electromagnetic Theory, Statistical Mechanics, and Theoretical Mechanics. I also learned programming and scientific computing. In addition, I took experimental courses, ranging from hands-on experiments to highly automated experiments using instruments, which cultivated and improved my experimental ability. I am grateful that both theoretical study and laboratory training help me better understand the major I study and track the progress of cutting-edge achievements.

Through constant communication with teachers and classmates, I found that there are no advantages or disadvantages between experiment and theory. I used to think that studying physics only requires a pair of dirty hands, throwing myself into the laboratory and conducting experiments. But later, after I was exposed to many experimental classes, I realized that if the principle behind the experiment wasn't figured out, the experiment itself would be meaningless. The purpose of experimenting is not to complete the task only, but to deepen my understanding of the theoretical knowledge. Theory is in fact as important as experiment.

I have a growing interest in quantum information, my undergraduate supervisor, Professor Ze-liang Xiang, studies quantum optics, and he uses quantum optics to conduct related research on quantum computing. And decoherence is one of the biggest problems that exist. Once the system changes from a pure state to a mixed state, no information can be obtained from it and no further calculations can be performed on it. And, decoherence will definitely not disappear, because of the inevitable interaction between the system and the environment. However, the strength of the interaction between different quantum systems and the environment is also different, and quantum error correction is currently difficult to meet the needs of practical quantum computing. Therefore I believe, decoherence is the dark cloud above quantum computing. I hope to use quantum optics or related optical methods to solve quantum computing problems, such as single photon distribution, or quantum state transmission by microwave cavity to help solve the problem of decoherence.

In the future, I want to be a physicist. First of all, I would like to spend a few years on physics research, cooperating with technology giants such as Google and IBM, who have a wealth of scientific and technological resources and are currently the world leader in quantum computing. With the aim to bring benefits to human society, I will focus my scientific research on the unknown areas related to quantum computing. Then, I hope to work in a university and get a teaching position, popularizing scientific knowledge and spirit, and cultivating the promising next generation.

Thank you for reading my motivation letter. Please consider me for the program and the scholarship. I am looking forward to your respond!

Yours,

Fan Lu