

November 28, 2024

Joshua Krauß  
RPTU Kaiserslautern-Landau  
Erwin-Schrödinger Straße 46  
67663 Kaiserslautern  
Germany

Dear Joshua Krauß,

I am writing to you to apply for the RISE project '*Theory for Photon Bose-Einstein Condensates*' at RPTU Kaiserslautern-Landau. I am a Junior Sophister student at Trinity College Dublin studying Theoretical Physics. Having read the project description, I would be excited to work on the described PBEC vortices and their interactions. I believe that I have the necessary background to contribute to the project, and the prospect of comparisons with empirical data within the project is particularly appealing.

As an undergraduate student, I have recently studied, and will in the coming semester study, modules in complex analysis, linear PDEs, quantum mechanics, statistical mechanics and electrodynamics, with a heavy emphasis on the underlying mathematics. I believe many of the topics covered in these courses, as described on the TCD maths website, would allow me to garner a solid understanding of the subjects being researched, as well as providing me the tools to contribute to analytical research. I have found these modules both enjoyable and inspiring, and have no doubt I would feel the same about such exciting research.

In addition to the high quality theoretical physics foundation I have outlined, I have also taken a module in computer simulations. I therefore have a decent understanding of many numerical methods, as well as their use in Python, especially as applied to physical and mathematical problems.

To conclude, I am applying for this project due to my interest in the photon Bose-Einstein condensates being researched, especially in terms of an analytical description, and the possible experimental comparisons. Thank you for your considerations.

Yours sincerely,

David Lawton.