

CASPEN Exit Report

Visitor: Dr. Tim Linden

Host Institution: Stockholm University

Home Institution: The Ohio State University

I attended Stockholm University and the Oskar Klein Center using funding from the CASPEN institute during during the week from June 19 to June 23. During this period, I gave the Oskar Klein Center Colloquium on June 20, and interfaced with a number of faculty members, postdoctoral fellows and students. During my time in Stockholm, I presented brand new results describing the TeV emission from galactic pulsars, refining a set of arguments which were produced as a paper several weeks later (arXiv: 1707.01905, Submitted to PRL).

Several particular interactions research discussions stick out during my time at Stockholm. I originally applied for CASPEN funding in order to meet with Prof. Jan Conrad and his group at Stockholm University. My major points of intersection were Andrea Chiappo, Benjamin Farmar, and Knut Morå. My work has significant overlap with his group's work on the indirect detection of dark matter with gamma-ray observations. While at Stockholm, we discussed recent advances on the search for dark matter annihilation in the dwarf spheroidal galaxies surrounding the Milky Way, a research topic which has previously produced published articles by both research groups (e.g. Hooper & Linden, JCAP (2015) 1509 09 016; Chiappo et al. (2017) MNRAS 466 669). These discussions were highly informative, and provided insight to an upcoming paper considering new methods for calculating dwarf limits in the presence of negative background fluctuations. I expect this paper to be released within the next few months. In addition to this work, we also discussed recent updates on the status of the Galactic Center excess, which includes a number of papers I have recently written which overlap with the scientific interests of Prof. Conrad's group.

In addition, I had the opportunity to have several unexpected, but highly useful, interactions with Prof. Chad Finley and Dr. Jon Dumm concerning the interpretation of recent IceCube results. These results have implications for my previous work concerning the total gamma-ray flux from the population of star-forming galaxies in our universe. Because this work concerns multiple-messengers (neutrinos, gamma-rays and infrared observations), and also a careful integration of theoretical and observational expertise, the ability to discuss these recent results was extremely useful. In fact, our discussion eventually turned to an in-depth discussion of how to improve the lines of scientific communication between IceCube experimentalists and gamma-ray theorists. This included discussing improvements to IceCube data releases which would make IceCube results more easy to integrate with existing theoretical models, as well as improvements in theoretical models which could motivate targeted IceCube analyses for new physics.

Overall, I found my experience at Stockholm to be highly rewarding both in terms of scientific topic and in terms of collaboration.

Sincerely,

~Tim Linden