

Year One Overview

**Sarah Fields Presentation for
Chuang Ji Research Group April
28th 2023**



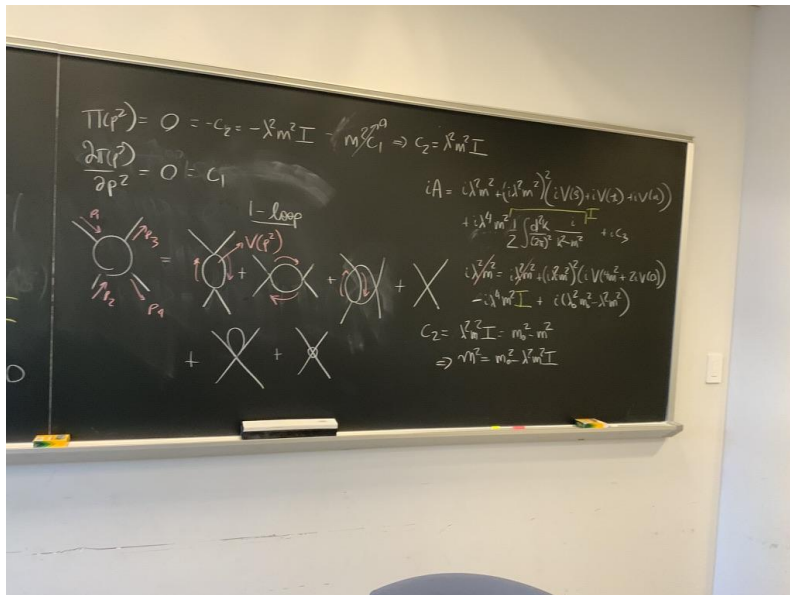
Brief Introduction

- I am a first year PhD candidate at Columbia University with interest in Lattice QCD
- I recently graduated from Clemson University's Honors college with a BS in Physics and a minor in Political Science
- I had the honor of learning from professor Ji in my last semester of Clemson, learning QED fundamentals
- Prior research interest include: working at the Lawrence Livermore National Laboratory in nuclear weapon physics, the Michigan State REU doing machine learning QCD and some biophysics research on Covid detecting devices in the height of covid



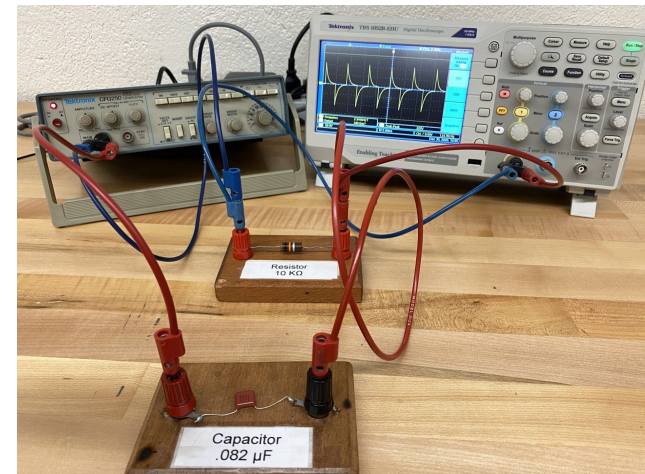
Classes

- Most of my first year, like most, has been consumed by taking classes.
- I have really enjoyed my QFT course, taught by Professor Frederik Denef, but we are closely following David Tong's lecture notes.
- This class has stood out to be because I see where the fundamentals work is starting to play in, for example working on gamma matrix identities has been extremely useful in calculating scattering amplitudes, etc.



Teaching Requirements

- The biggest transition I have had has been teaching
- As a first year at Columbia you are required to grade at least one general undergraduate exam and final, run help room, and teach one undergraduate physics lab
- I have greatly enjoyed being a teacher and being more hands on through lab work, yet it was a huge time requirement these last semesters.



Extracurricular Activities



Research Group

- My mentor is Dr. Norman Christ
- Our group's main focus is to improve lattice QCD predictions to test the standard model, and hopefully find new physics through the study of standard model phenomenon on the lattice
- Specifically, our group is interested in studying Kaon decays, and increasing the accuracy of the standard model predictions on associated calculations



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Norman H. Christ

AFFILIATED GRADUATE STUDENTS

			
Sarah Cole Fields PhD Student	Ceran Hu PhD Student	Yikai Huo PhD Student	Erik Leonard Lundstrum PhD Student
Research Interest High Energy Nuclear Particle Physics, Norman H. Christ	Research Interest High Energy Nuclear Particle Physics, Norman H. Christ	Research Interest Theoretical Physics, Norman H. Christ	Research Interest High Energy Nuclear Particle Physics, Christ Lab, Norman H. Christ

Summer Research Plans

- Studying Lattice QCD fundamentals
- Speed- Up project: Working to increase speed of Markov chain Monte Carlo generation of gauge field ensembles and working to improve slow down that occurs
- QED corrections
- Columbia Physics Preceptor

Thank You!