Week 1 Presentation

PHY 496

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Project Summary

- The Minimal Supersymmetric Standard Model is a possible extension to current models of particle physics.
- The full theory has over 100 free parameters
- Simulation programs such as SUSY-HIT and PROSPINO exist which can make predictions from the MSSM, but they are very slow
- The phenomenological MSSM has only 19 parameters, but that is still too many for normal methods.
- This project will use Bayesian Neural Networks to try and learn the relations between the parameters and supersymmetric particle cross sections.

Preliminary Setup

- Dr. Kuchera created my account on the Linux Cluster and the computer Karbo worked on.
- Linked Python 3 to Jupyter Notebooks on my cluster account
- Setup Tensorflow and Tensorflow-Probability on the cluster
- Copied some of Karbo's data creation programs off of his computer
- Completed contract and submitted independent study form to Registrar

GitHub account

- Created GitHub account brkronheim
- Completed a tutorial and learned the following:
  - Online repository creation, commits, branching, pull requests, and merging
- Learned some important git commands:
  - Init, clone, pull, add, rm, commit –m, push
- Current repository is on GitHub, the cluster, and my local computer
- Repository name is BNNs-for-SUSY

Goals for next week

- Learn more Linux commands
- Move PROSPINO and SUSY-HIT onto the Linux cluster
- Learn how Karbo's data creation program works, possibly modify it
- Create training data
  - Initial data will be generated from a random distribution of pMSSM parameters
- Start creation of neural network if data generation goes smoothly