ALPhA Summer Week 6 Presentation

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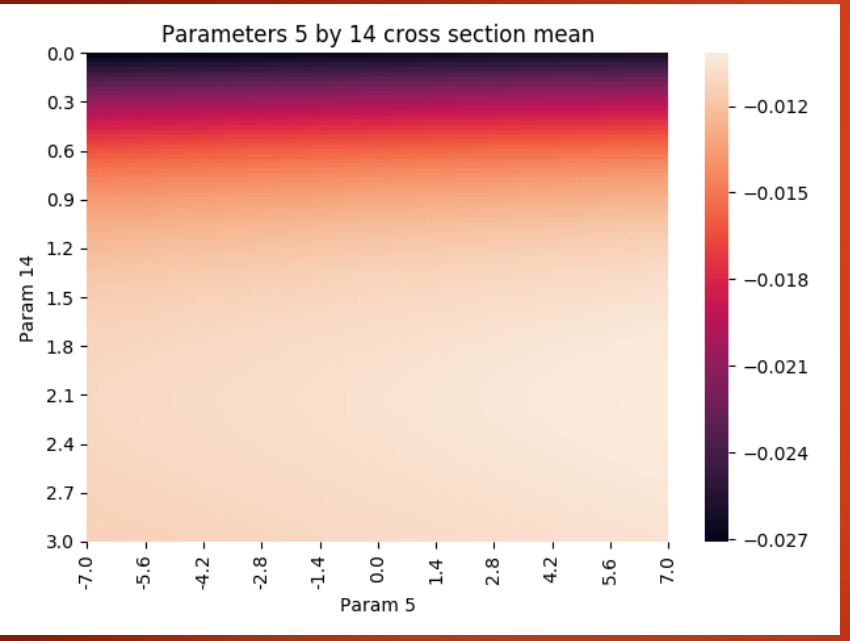
Summary

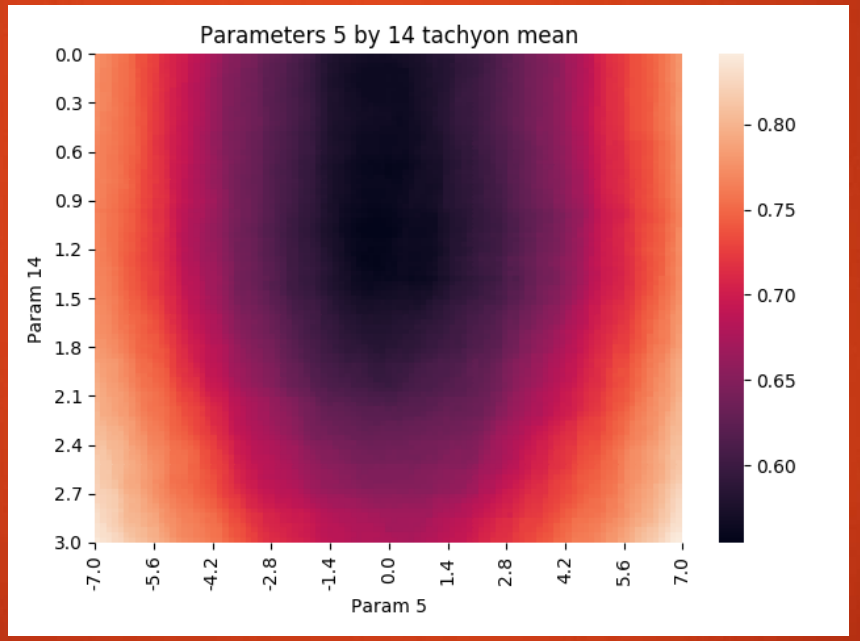
- Wrote code to more easily interface between tachyon and cross section models
- Generated heatmaps of cross sections and tachyon location as a function of two variables
- Created a small data set (~10,000 points) of pMSSM parameters to sparticle and higgs masses.
  - Ran some basic training
- Started creation of a dataset with all softsusy errors
  - Tachyons are the majority of these errors, but there are others that crop up

Tachyon heatmaps

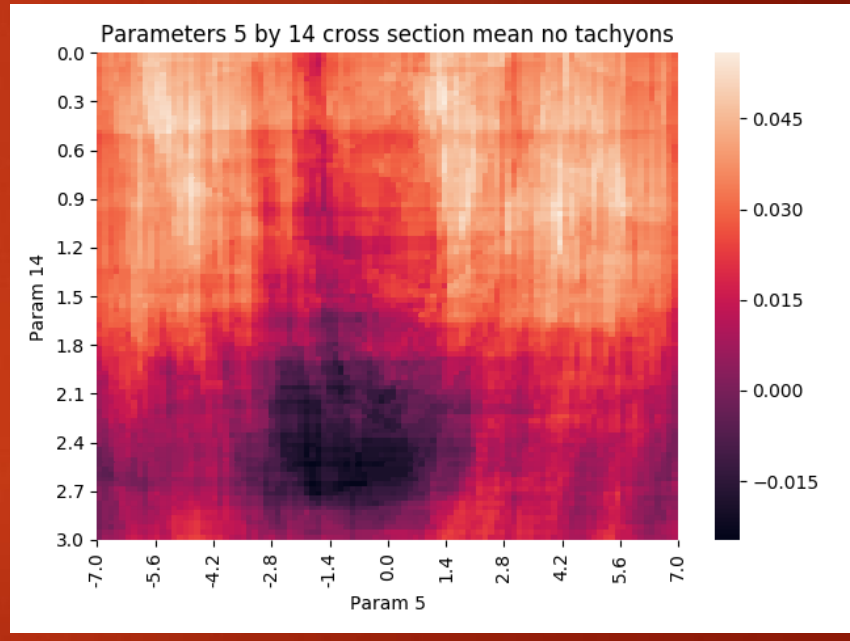
Cross section distribution with tachyons



Tachyon distribution



Cross section distribution with no tachyons



Data generation and training

- Around 2/3 of parameter combinations fed into softsusy give tachyons
  - When only parameters combinations which are classified as not tachyons by the neural net are used, only about 7% of points are rejected
- Training on the mass data:
  - When training on the full data set with 33 masses the test squared error is 0.0488 and the training is 0.0046.
  - When training on just the lightest neutral higgs mass, the test squared error is 0.6899 and the training is 0.0592
  - Both of these over trained and need a larger data set

Goals for next week

- Generate 500,000 points of training data for the masses and for a general classifier of good softsusy point vs. bad softsusy point
  - Train a network using keras and then my BNN code
- Interpret the heatmaps generated with only good softsusy points