

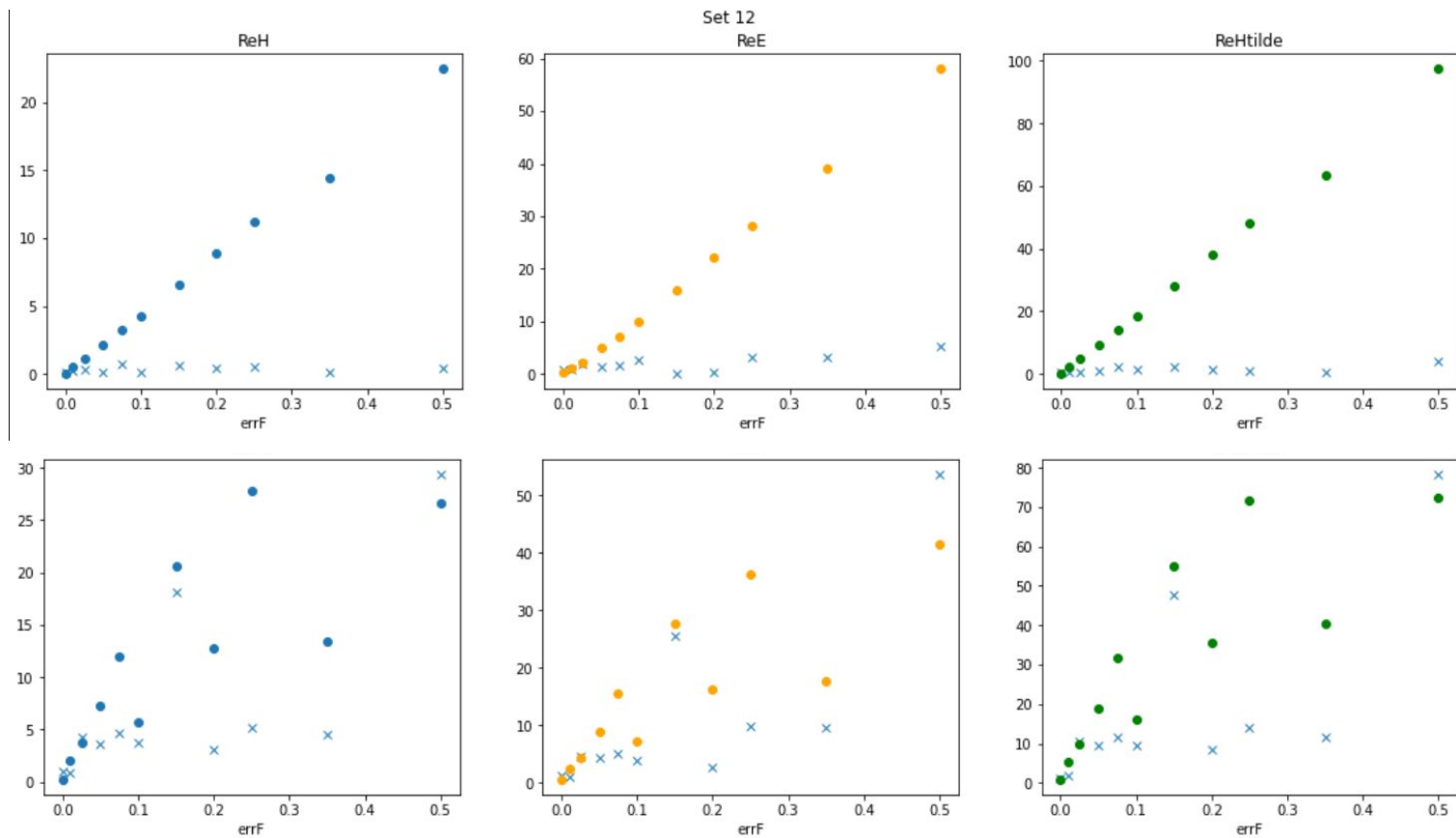
03/18/2022

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# Recap

- Exploring how  $\text{err}_F$  affects the accuracy and spread of the predictions
- What I found:
  - For some sets the accuracy of the predictions are not dependant  $\text{err}_F$  (near horizontal line) while for some other sets the accuracy fluctuates wildly (no real pattern)
- Initial Attempt at Understanding this behavior
  - Sets that have a larger BH term cause for worse fits and are a lot more sensitive to the error on F

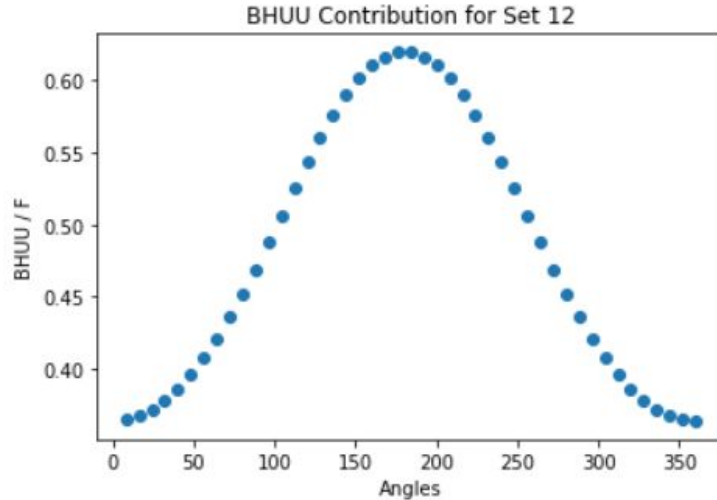
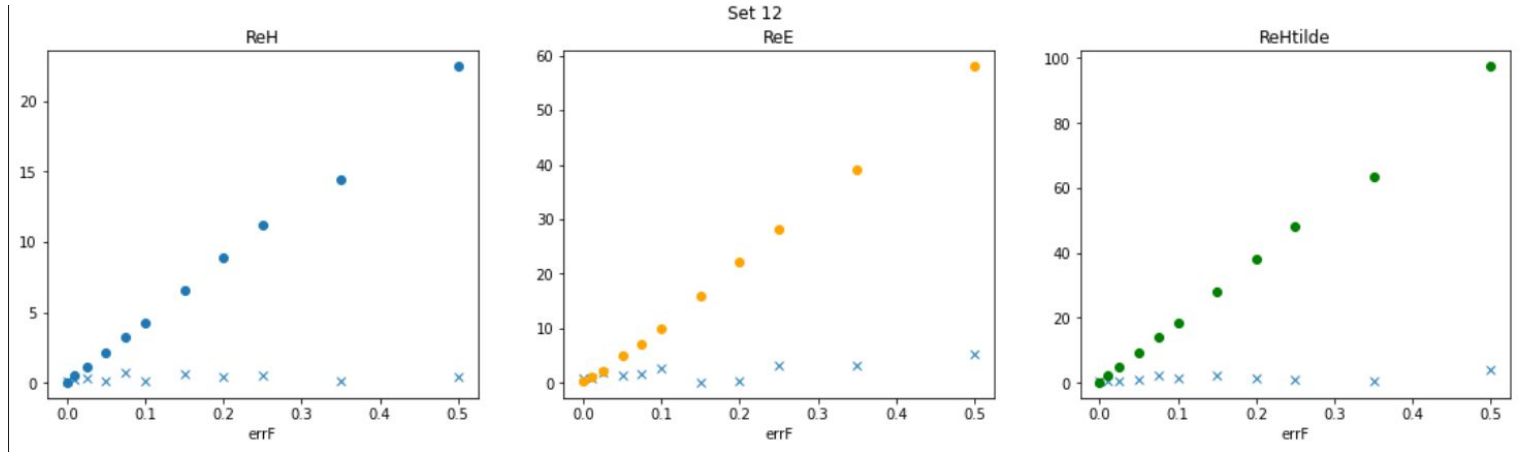
# Comparison Between Two Sets (Set 12 v Set 99)



# What I did

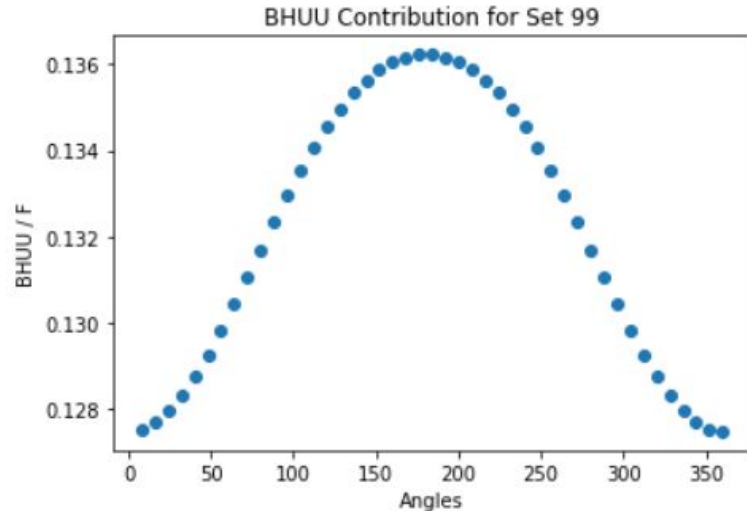
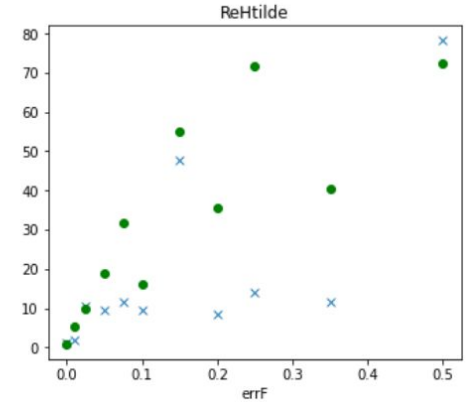
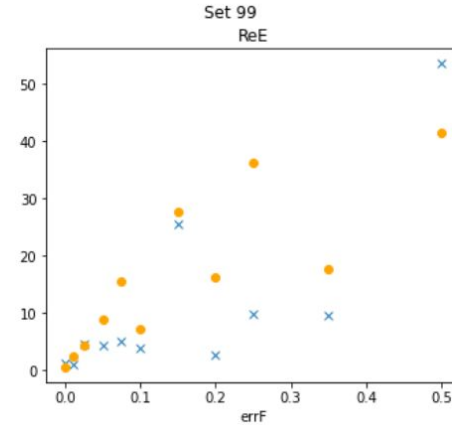
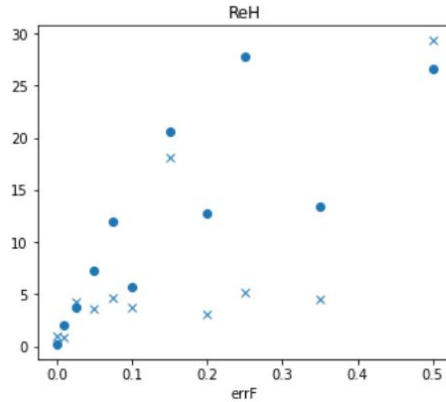
- Tested the hypothesis about larger BH terms causing more sensitive fits by graphing out contribution of BH to the F over the angles for all fits
  - Checking whether larger compositions have a worse/more sensitive fit
  
- Check this on more kinematic sets

# Set 12



Good Fit and accuracy is not sensitive to error

# Set 99

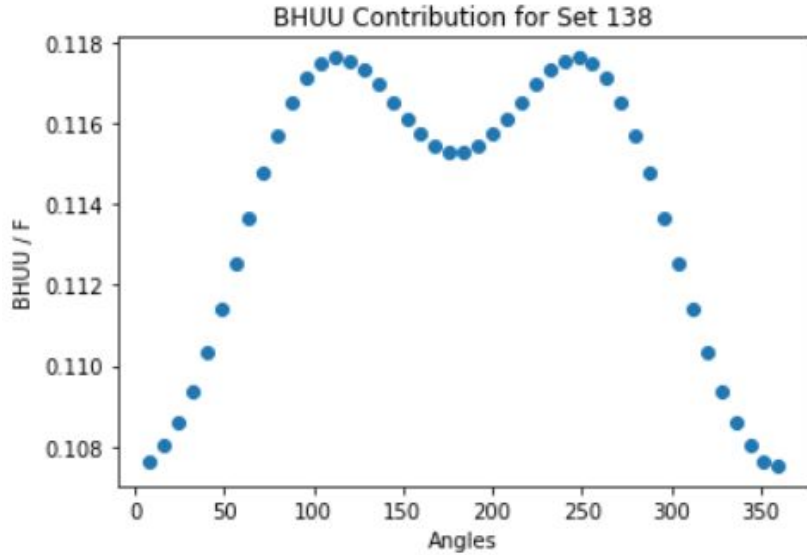
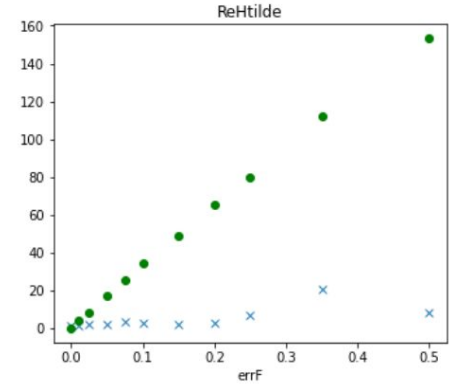
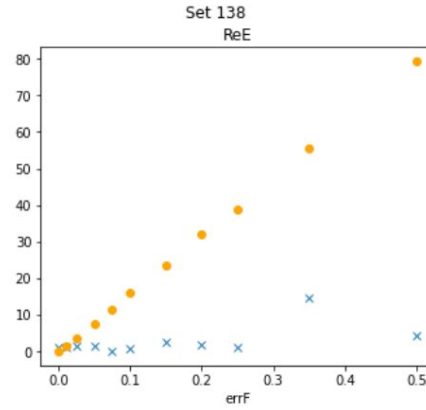
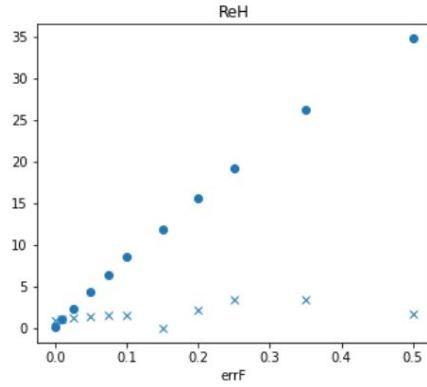


Bad fit and very sensitive to errF

However, the contribution of BHUU to F is very small

- Doesn't really support the hypothesis

# Set 138



Accuracy is not sensitive to errF and BHUU/F is relatively small

Set	Sensitive to errF	Peak BHUU/F	Min BHUU/F
12	False	0.60	0.35
99	True	0.136	0.128
138	False	0.118	0.108
265	False	0.7	1.1
312	True	0.170	0.135
403	False	0.625	0.450



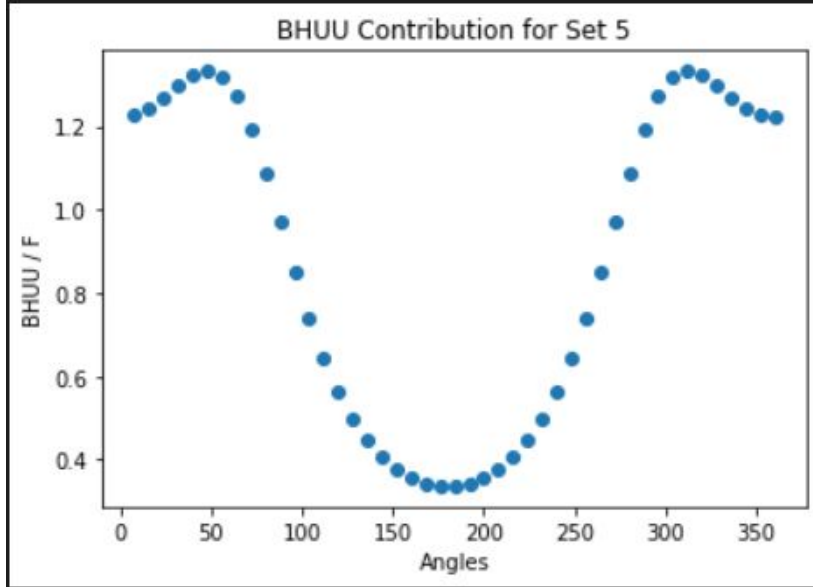
# Notable Observations Sets 1-16

Best Fit Lines if ErrF is in Percent

ReH Acc Best Fit:  $-0.002x + 1.6026$

ReE Acc Best Fit:  $0.0668x + 11.9102$

ReHtilde Acc Best Fit:  $0.0001x + 2.3054$



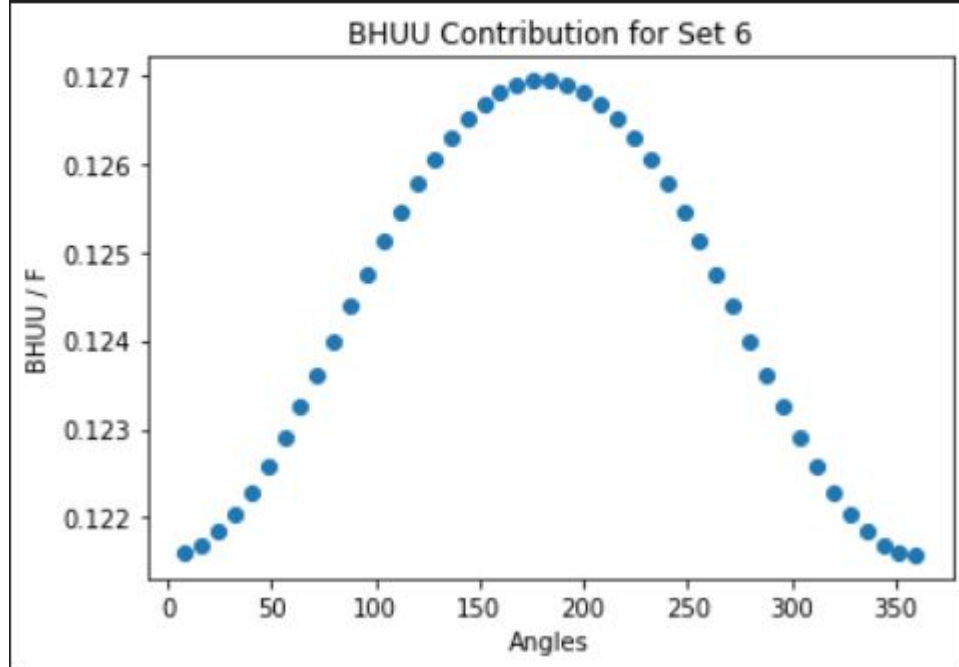
There are angles where the contribution of BHUU is very large, but there is practically no impact on accuracy of the model regardless of the error

Best Fit Lines if ErrF is in Percent

ReH Acc Best Fit:  $0.4329x + 3.2944$

ReE Acc Best Fit:  $0.4597x + 4.5595$

ReHtilde Acc Best Fit:  $1.032x + 8.5773$



The BHUU contribution compared to the previous set is much lower (0.127 compared to 1.2) but this set is MUCH more sensitive to the error on F

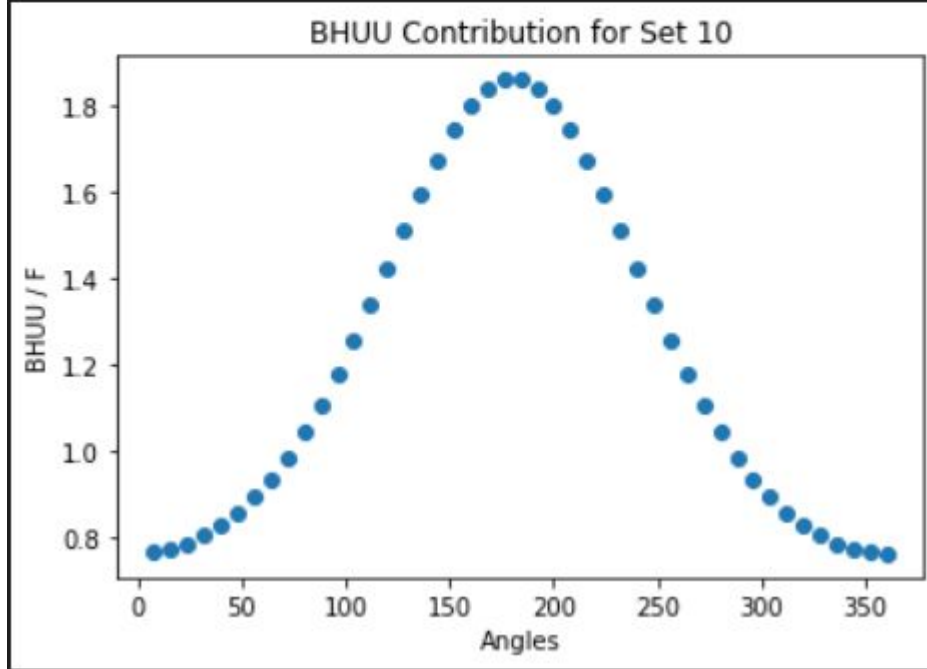
The fits were extremely bad for larger errors

Best Fit Lines if ErrF is in Percent

ReH Acc Best Fit:  $0.0034x + 0.1595$

ReE Acc Best Fit:  $0.0683x + 5.2359$

ReHtilde Acc Best Fit:  $0.0387x + 1.8317$



At its peak the BHUU contribution is very large but the accuracy of the predictions is not sensitive to the error on F

# My Takeaways

- It doesn't seem that the percent contribution of BHUU is related to the sensitivity of the predictions when the error on F is changing
- It seems that the opposite is actually true but only one way
  - Most of the sets that have large fluctuations in the accuracy for different errors of F have relatively small BHUU contributions to F
  - However, there are many sets where the BHUU/F is small but the accuracy does not have wild fluctuations