

# Complex Faraday Structure in the ATCA Beta Test Fields

Various musings on Faraday complexity

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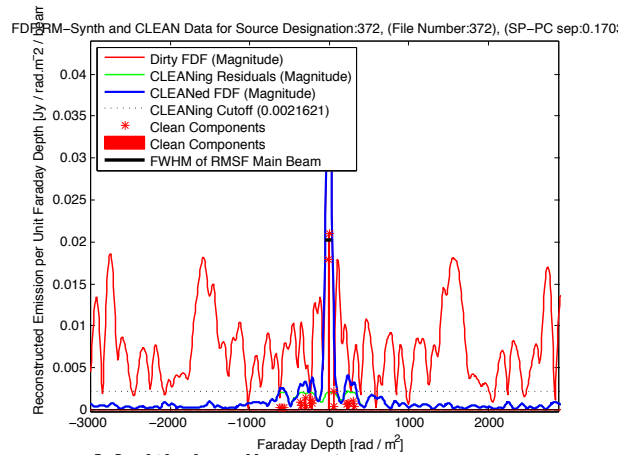
## Can we define different types of Faraday Complexity?

The existence of different categories of Faraday complexity has been suggested in the literature before:

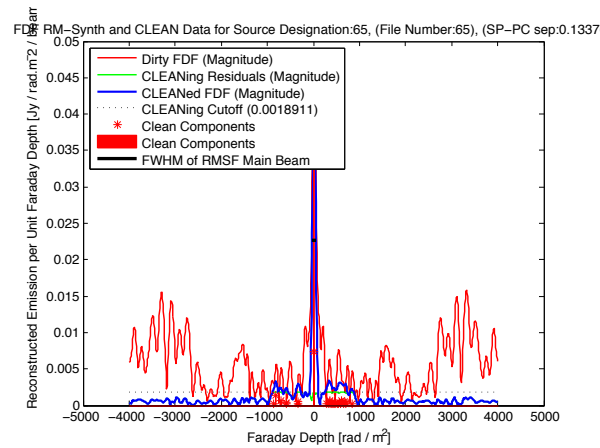
- Slysh, Goldstein & Reid (Two-component)
- Burn (Number of different depolarization models)
- Law (+Many-component sources, Faraday thick structures?)
- Farnsworth (+Multiple comps, depolarizing screen models)
- O'Sullivan (+Three-comp. model with Faraday thin or thick)

Is there evidence of this in the ATCA BTF data?

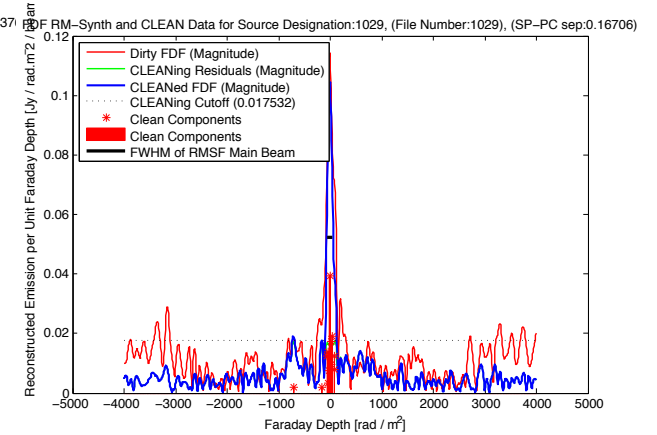
# Can we identify different types of Faraday Complexity?



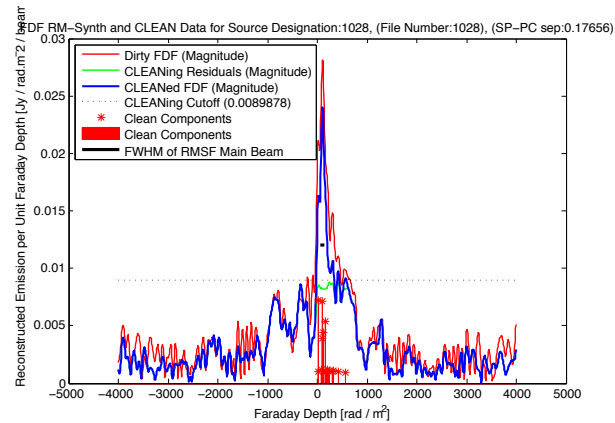
Multiple discrete comps



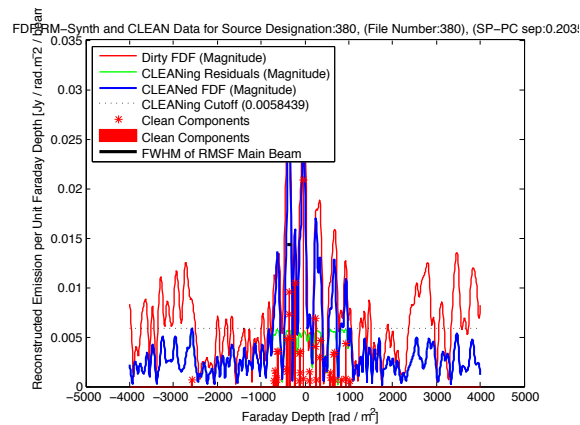
Broad continuous structure



Dominated by comps unresolved in RMSF beam

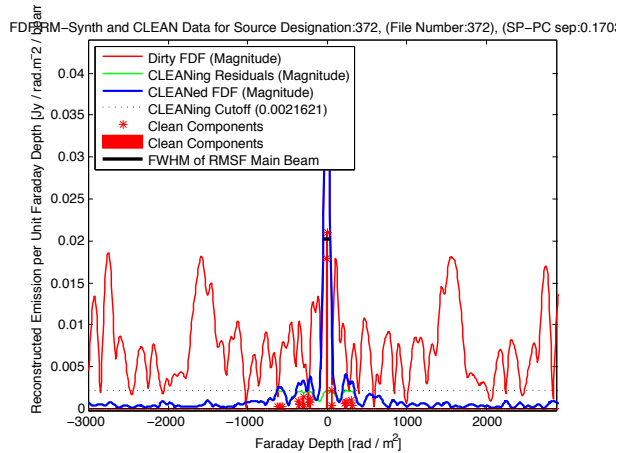


Multiple broad FD structures

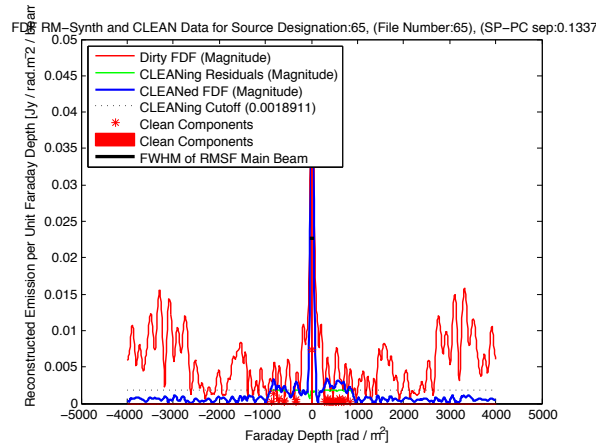


Dominated by numerous FD comps.

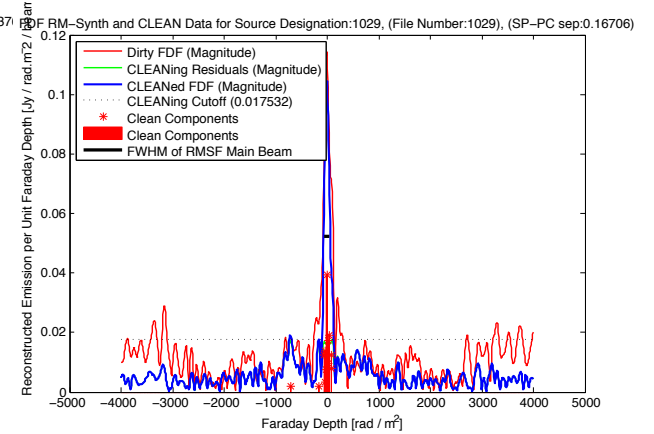
# Can we identify different types of Faraday Complexity?



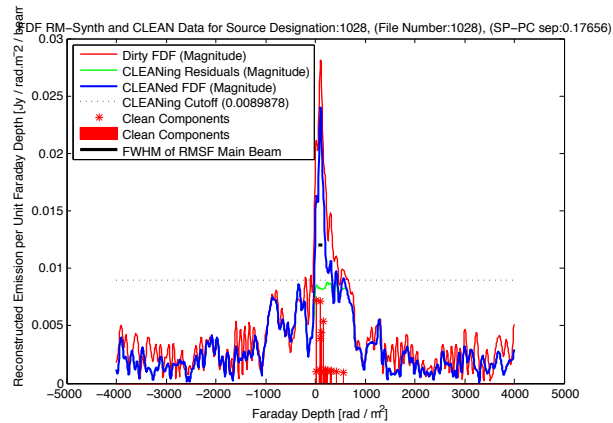
Multiple discrete comps



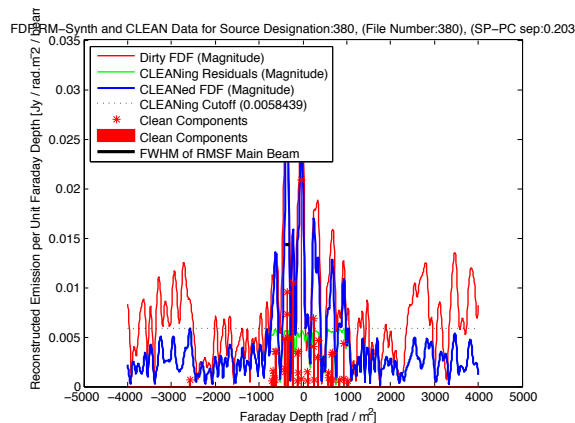
Broad continuous structure



Dominated by comps unresolved in RMSF beam



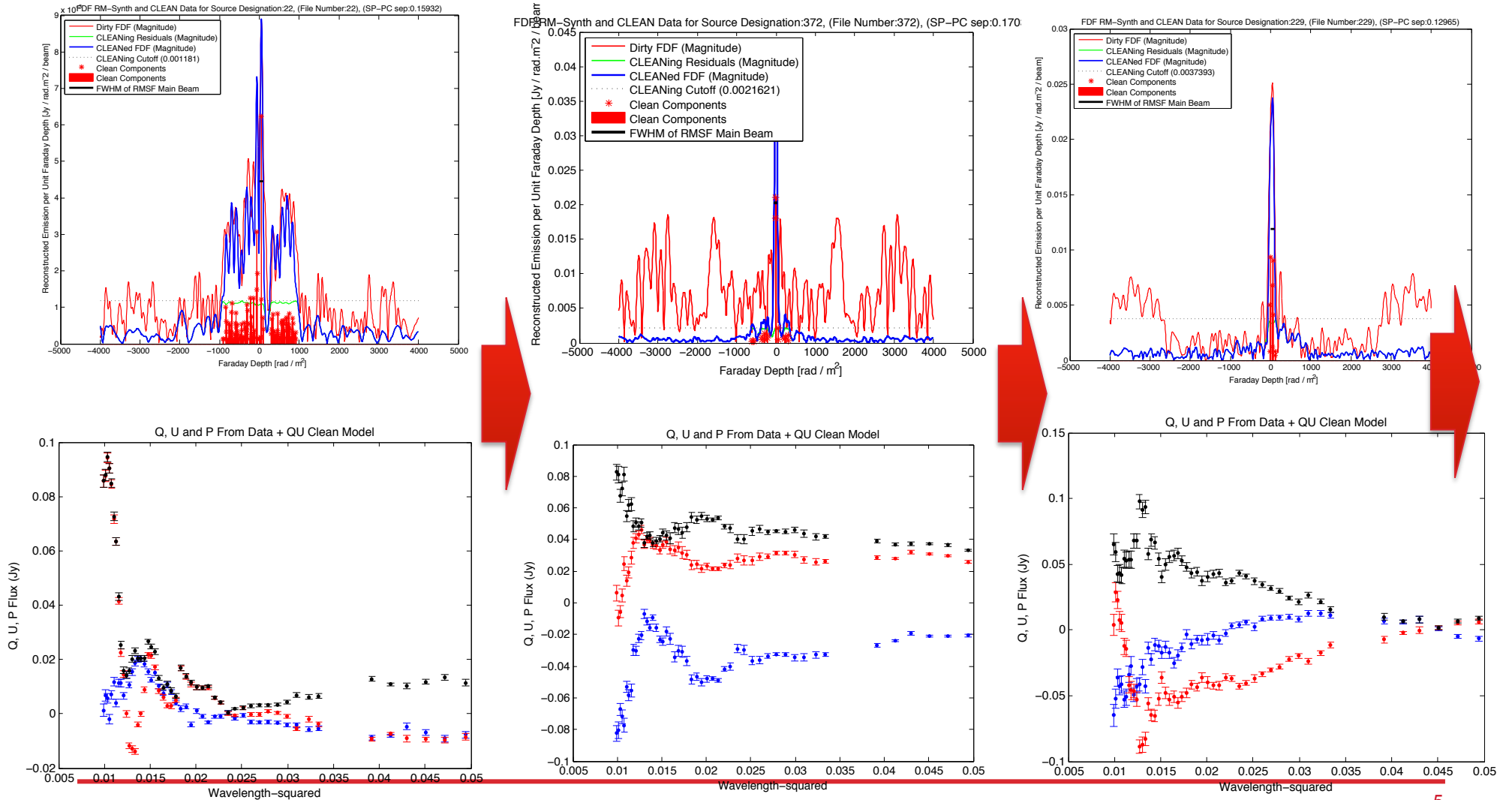
Multiple broad FD structures



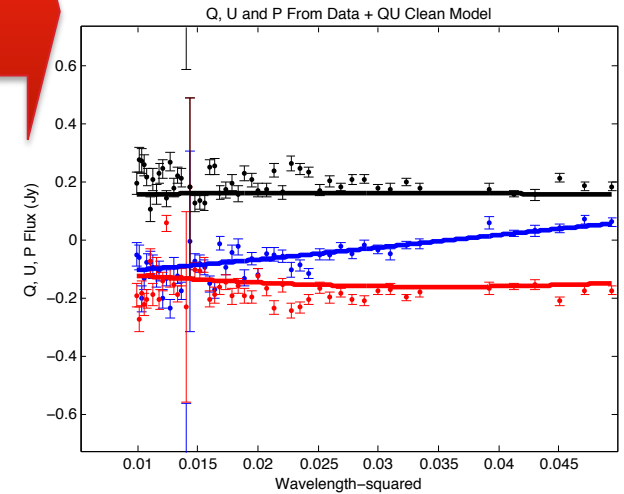
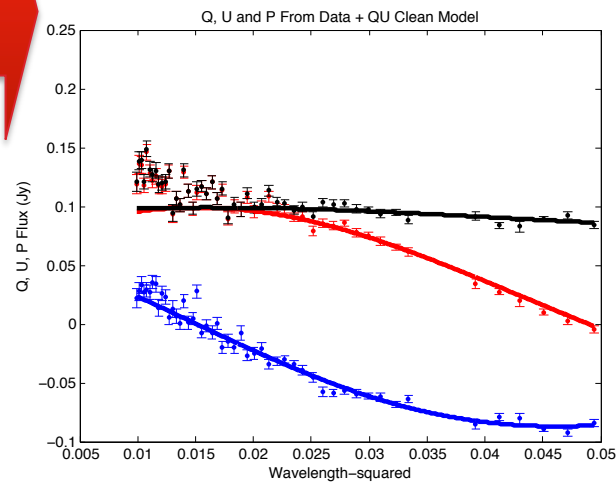
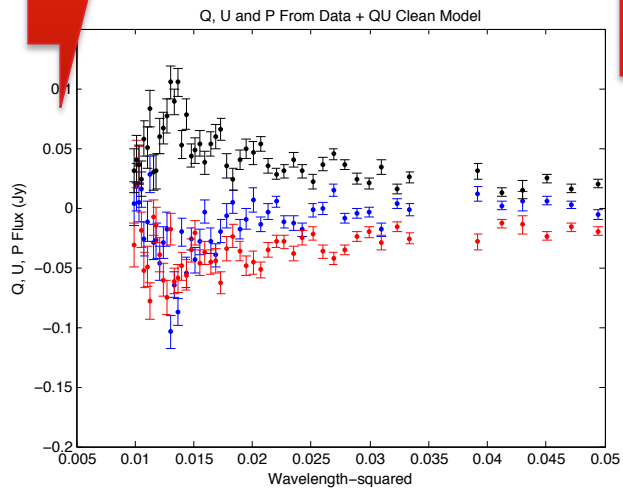
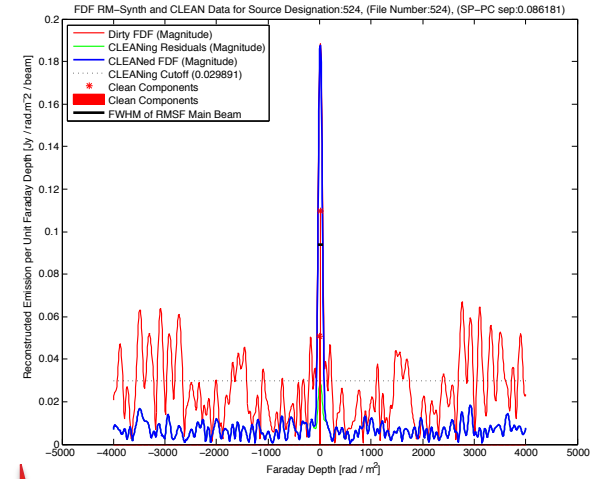
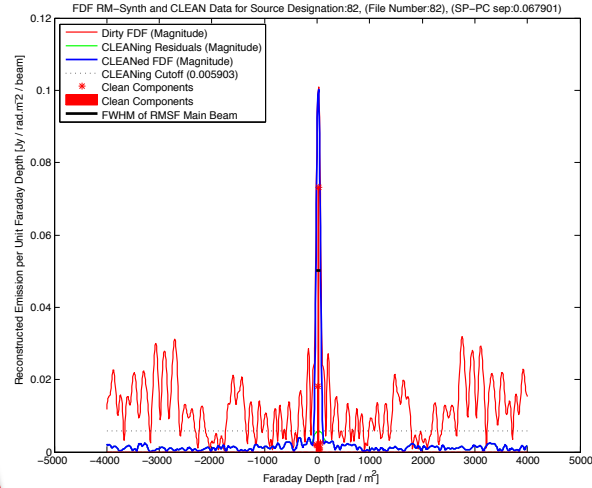
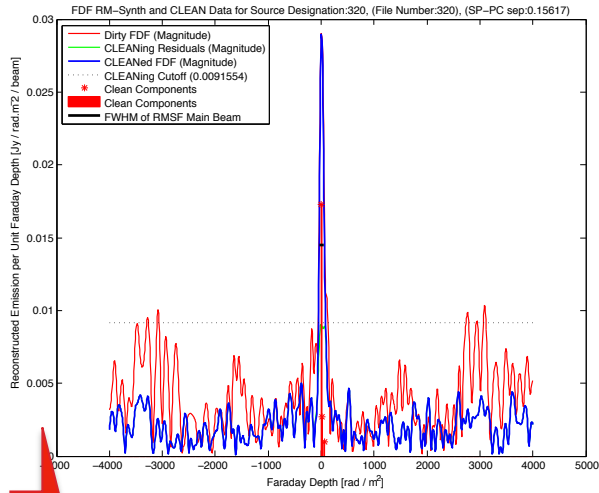
Dominated by numerous FD comps.

Perhaps we can. How physically meaningful is this? How much does it help us reconstruct/discern the physics?

# Is Simple/Complex Bimodal or a Progression?

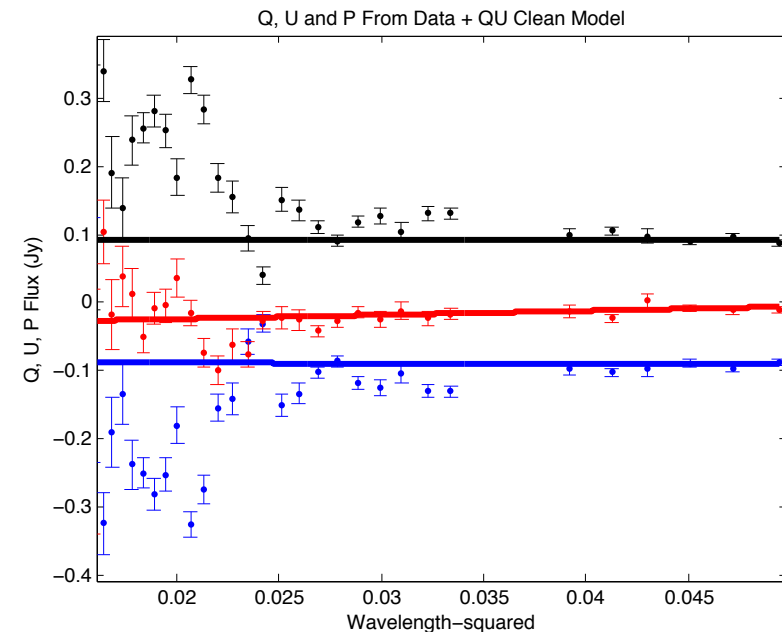
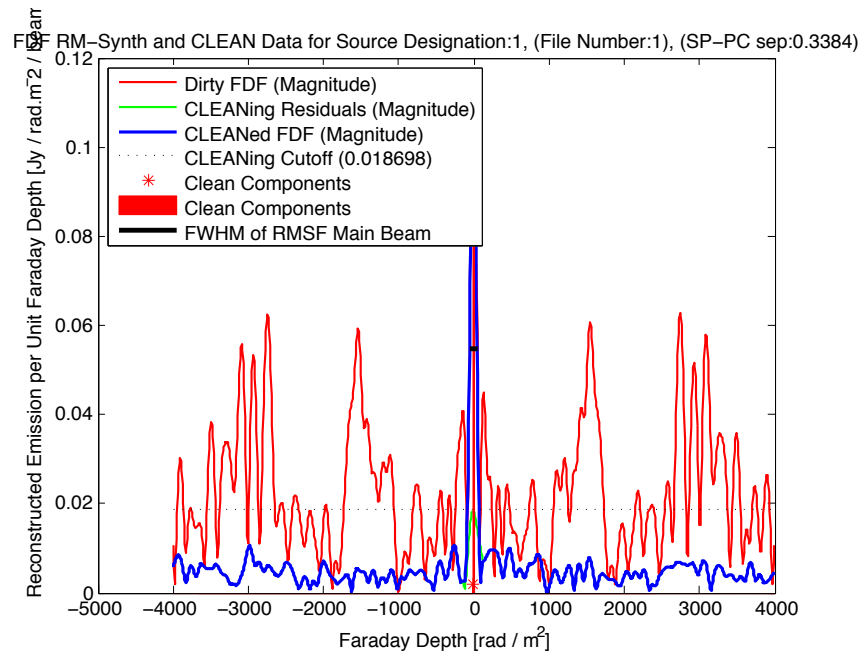


# Is Simple/Complex Bimodal or a Progression?



# Defining and Detecting Faraday Complexity

How do we define a 'complex' source? Do we just look at spread of CCs?  
 What about just looking for change in P? Are we making a physically meaningful distinction, or is it just a matter of degrees?



# Defining and Detecting Faraday Complexity

Figure 1: RM-Synth and CLEAN Data for Source Designation:1, (File Number:1), (SP-PC sep:0.3384)

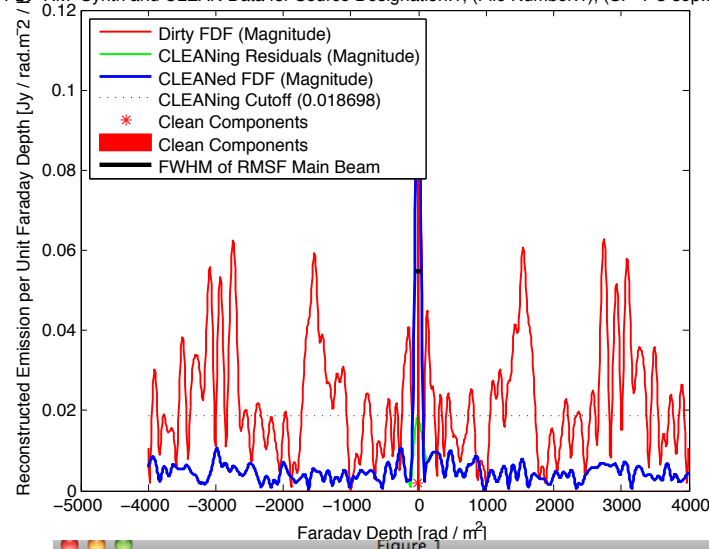
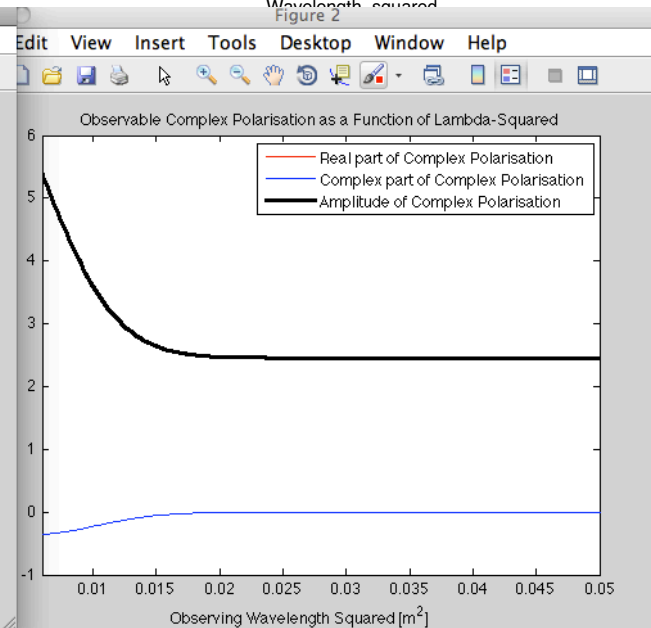
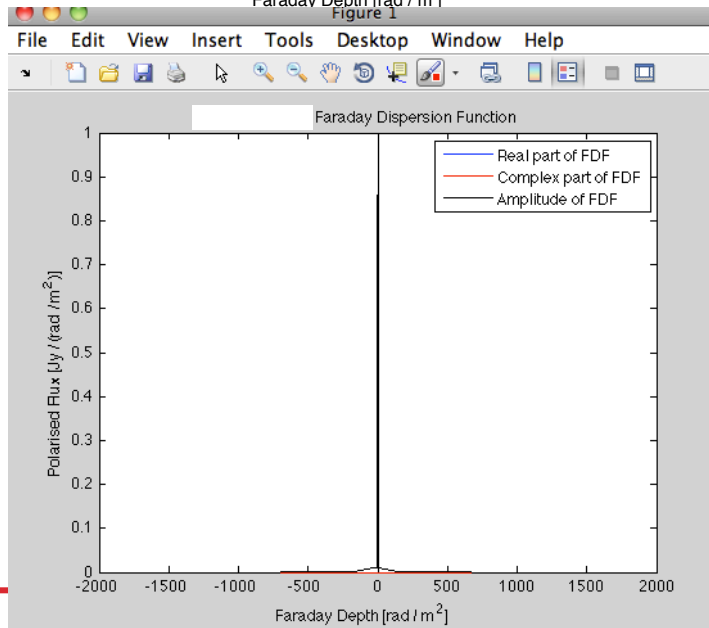
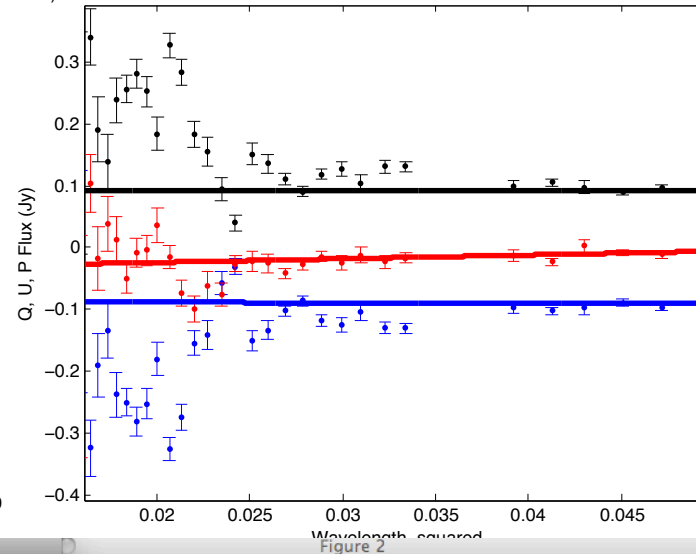


Figure 2: Q, U and P From Data + QU Clean Model





# What will POSSUM see in terms of complexity?

