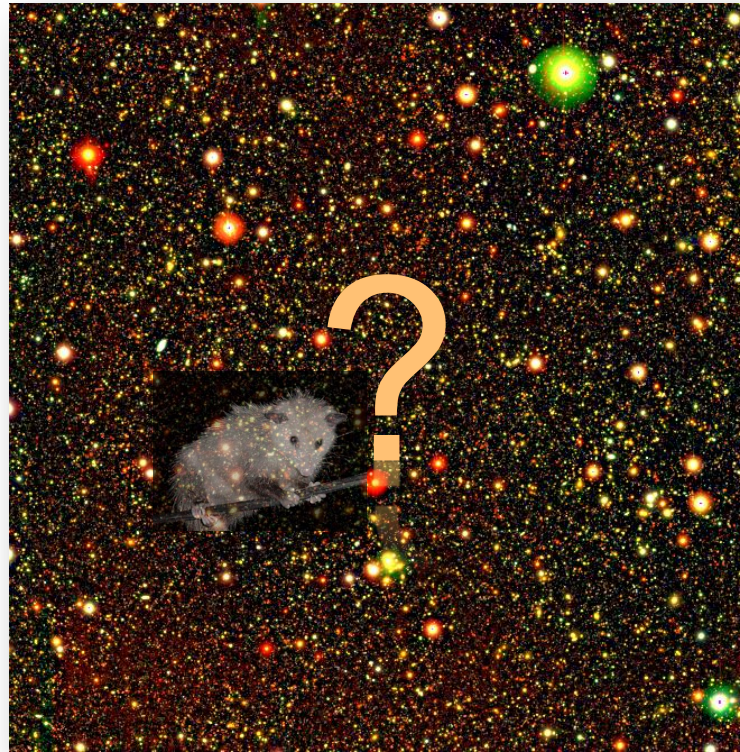
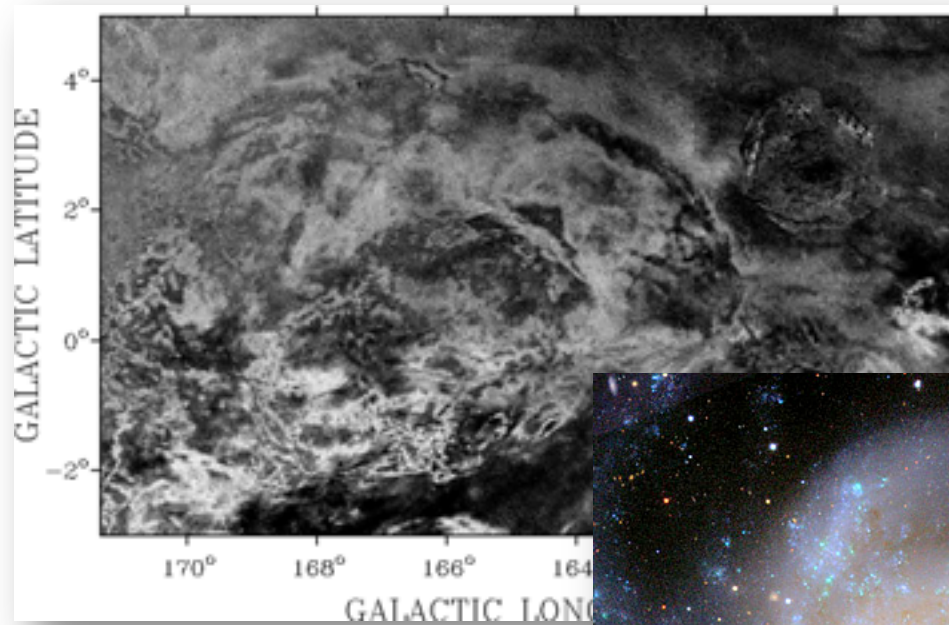


Polarization counts ++ at low fluxes with the Jansky VLA



Lawrence Rudnick
Minnesota Institute for Astrophysics



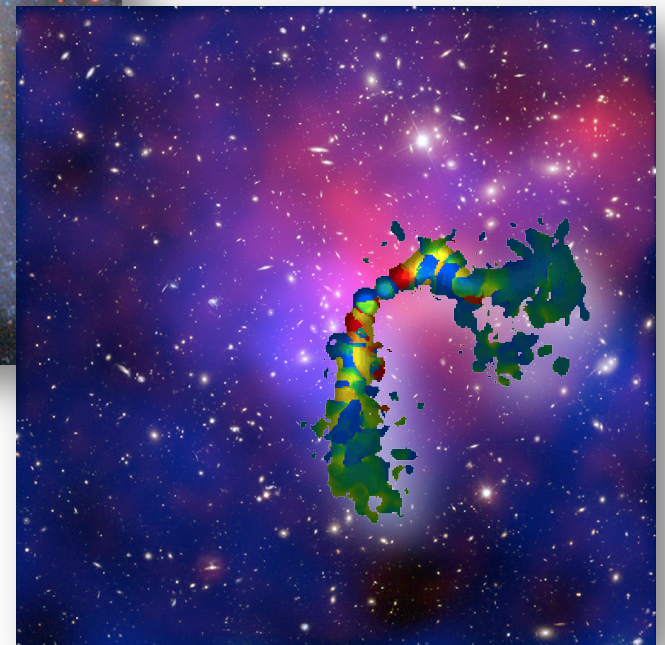
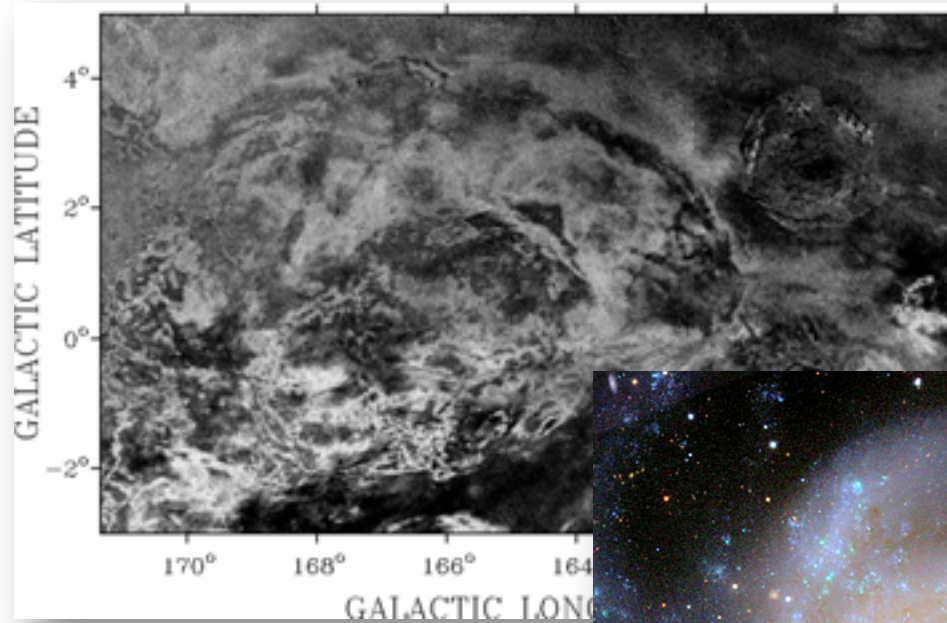
Probing
 μG
fields with
background
source RMs



- ★ Number of background sources
- ★ RM distribution of background srcs

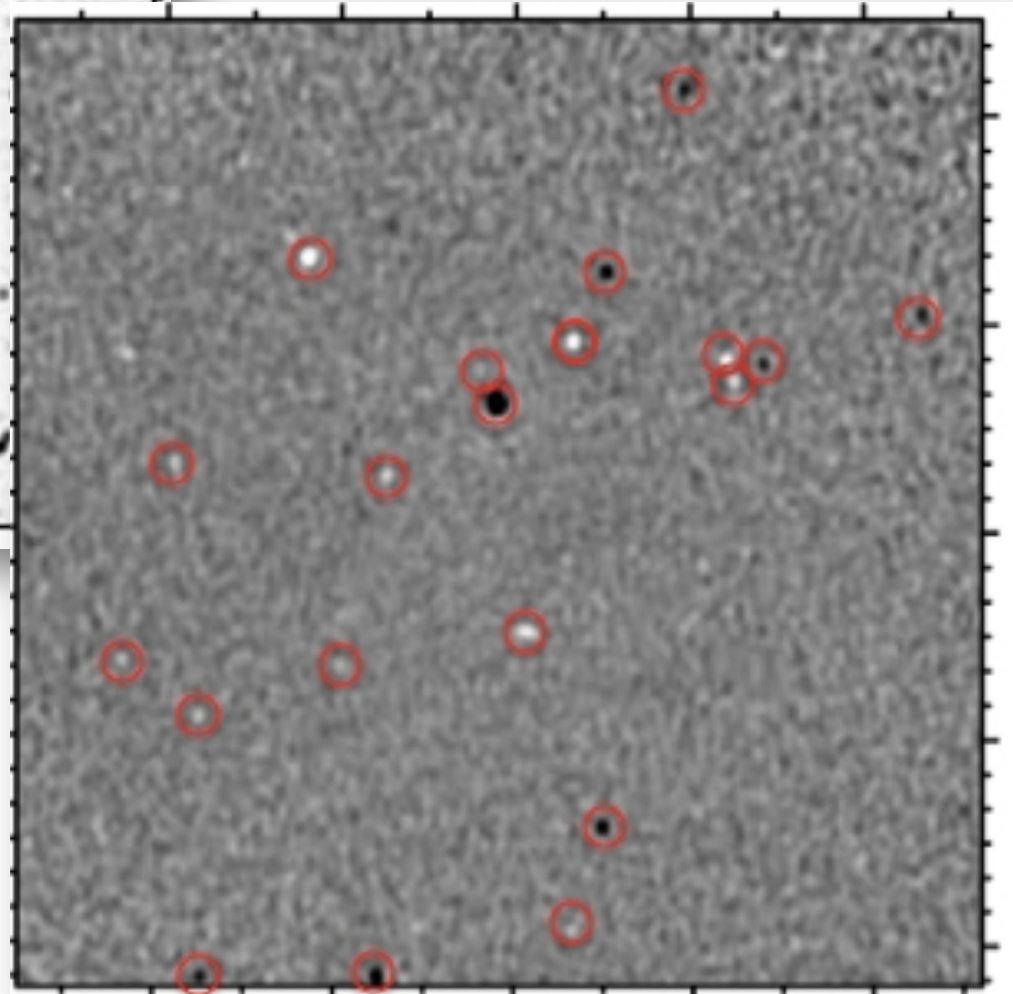
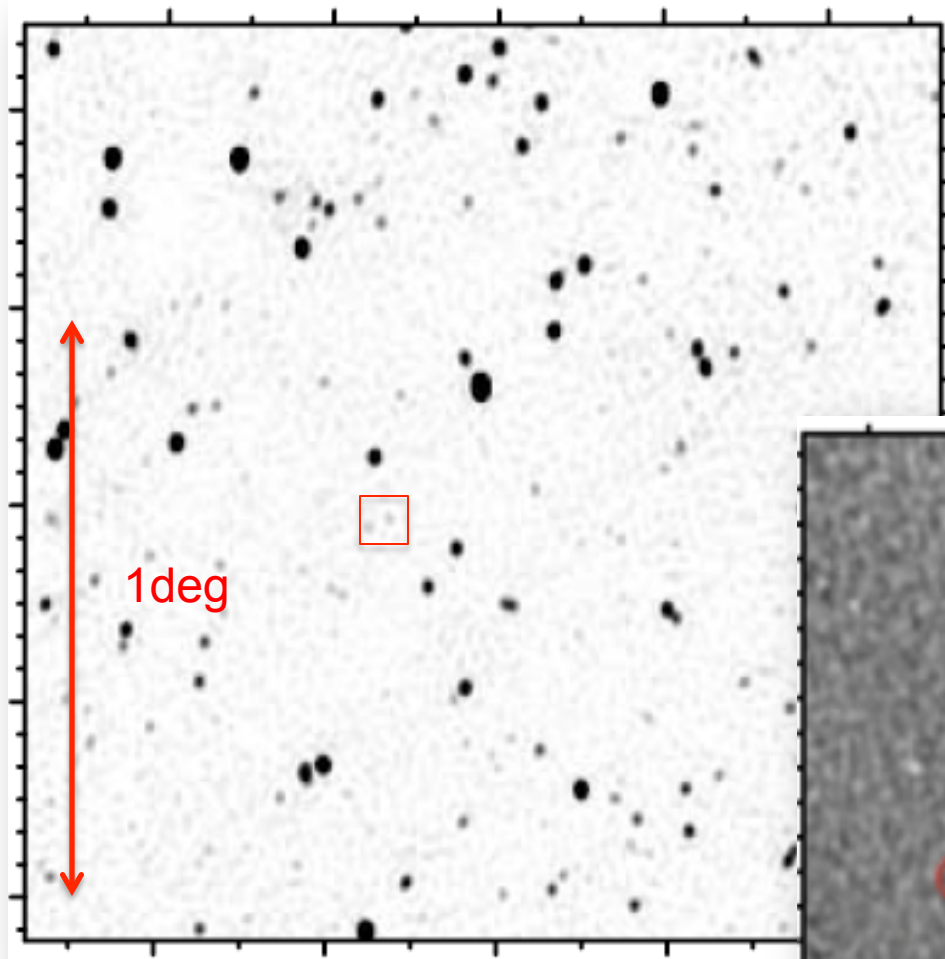
Probing μG fields with background source RMs

★ How can we use
embedded sources?



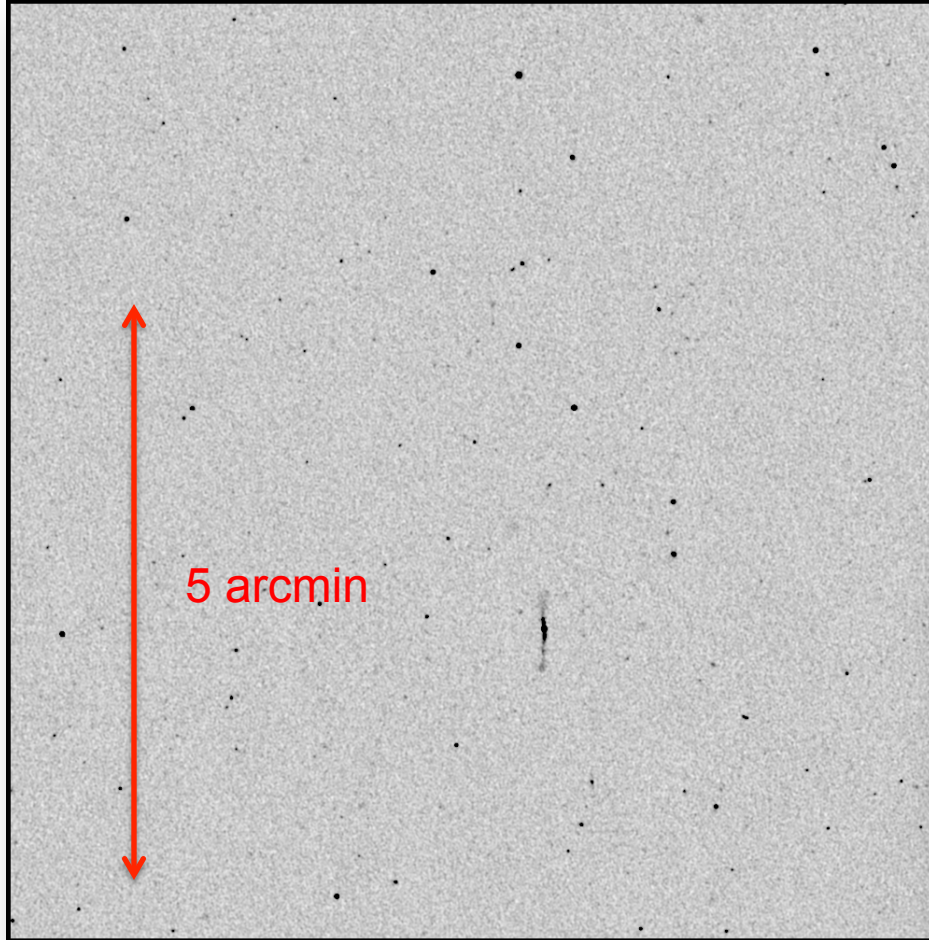
- ★ Number of background sources
- ★ RM distribution of background srcs

Wide-shallow 400 μJy



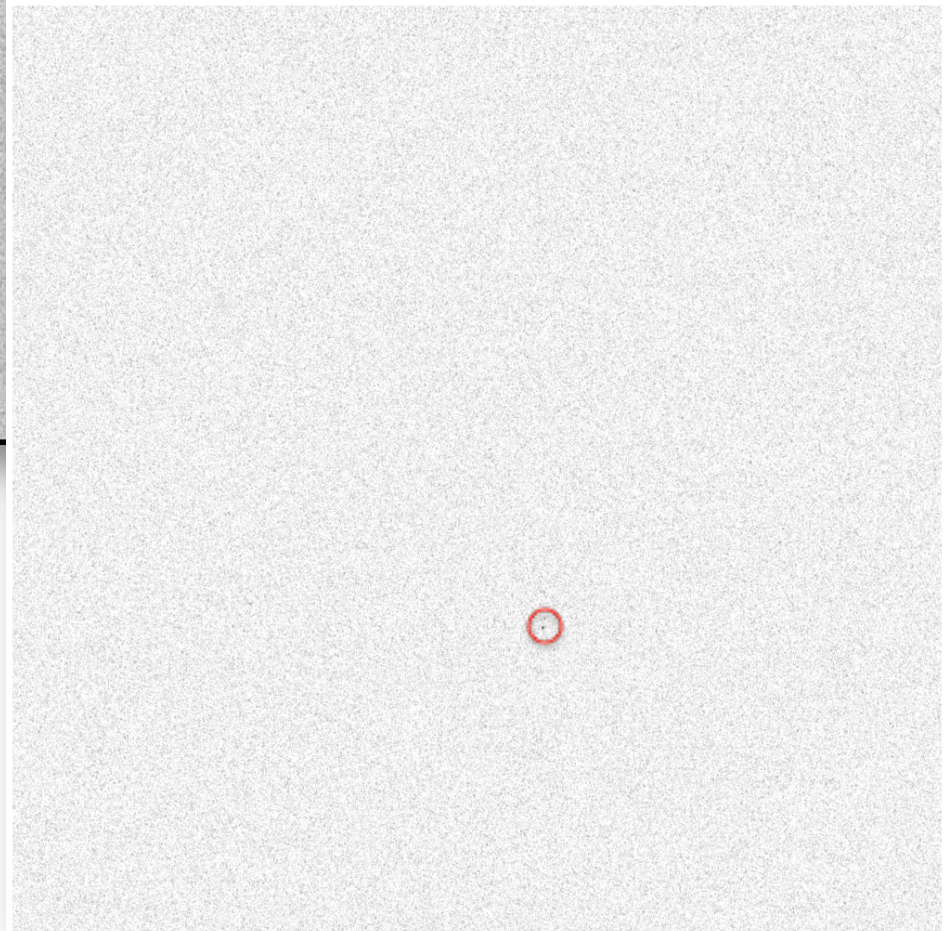
EliasN1 field
Taylor et al. 2007
ApJ 666, 201

Narrow-deep $27\ \mu\text{Jy (p)}$



GOODS North
~11hr [39h] Jansky VLA
~1-2 GHz (~500 MHz)

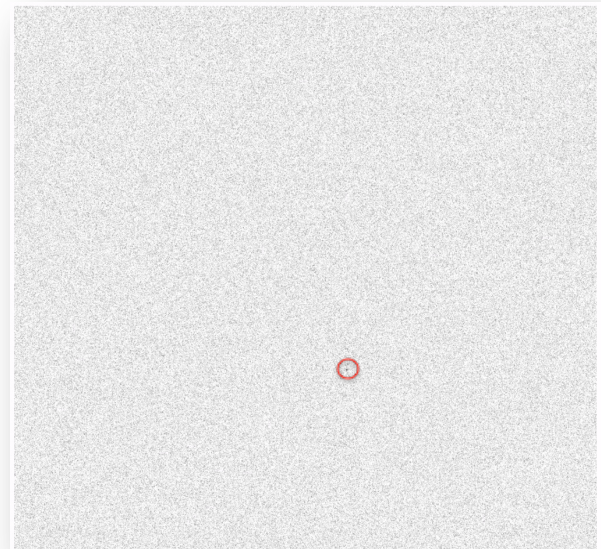
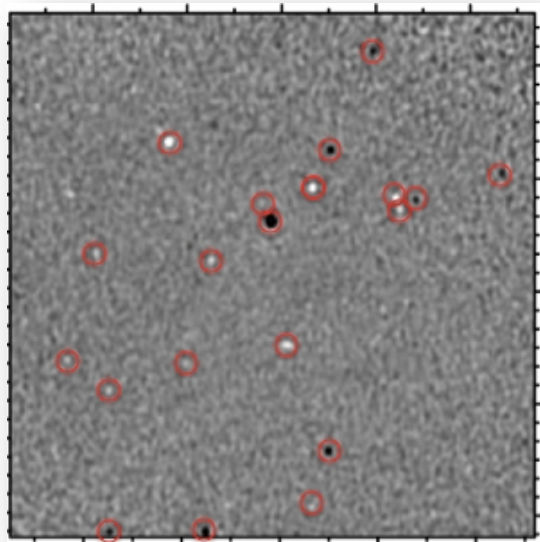
F. Owen, NRAO





POSSUM Wisdom

Below 1 mJy, polarized number counts fall dramatically below total intensity counts

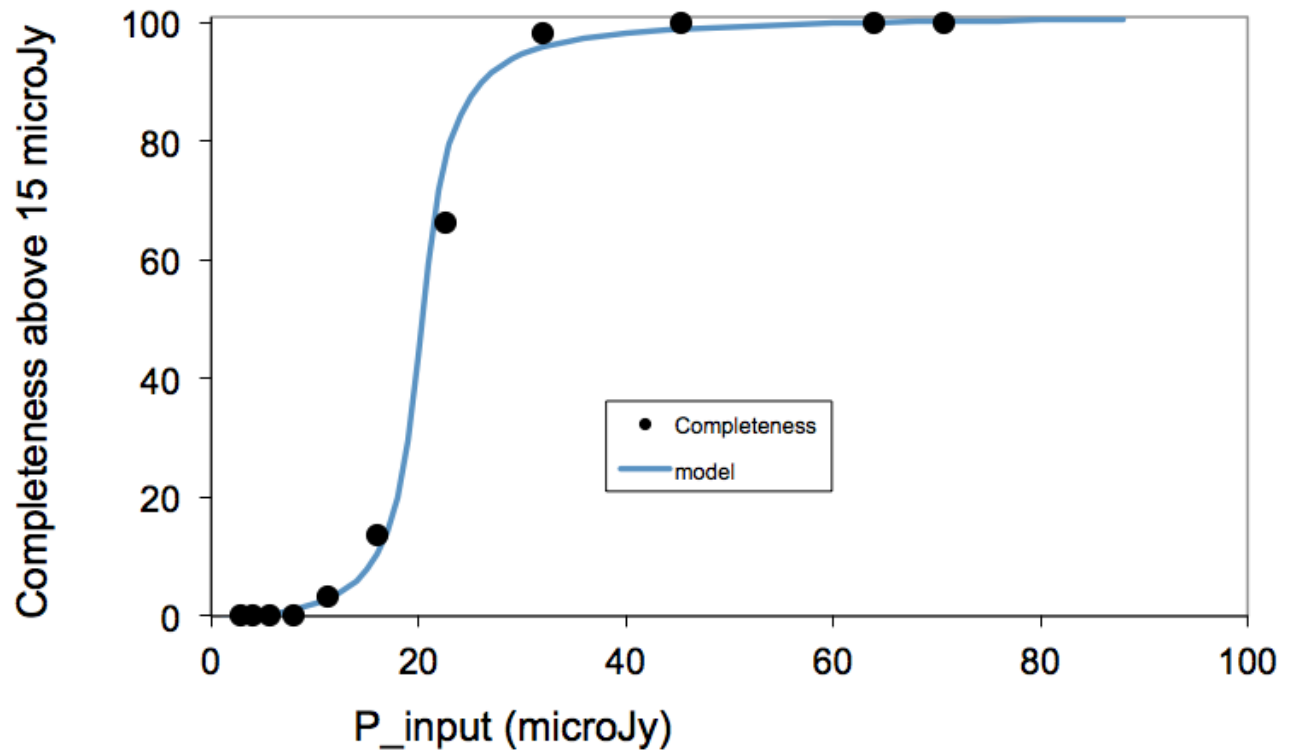
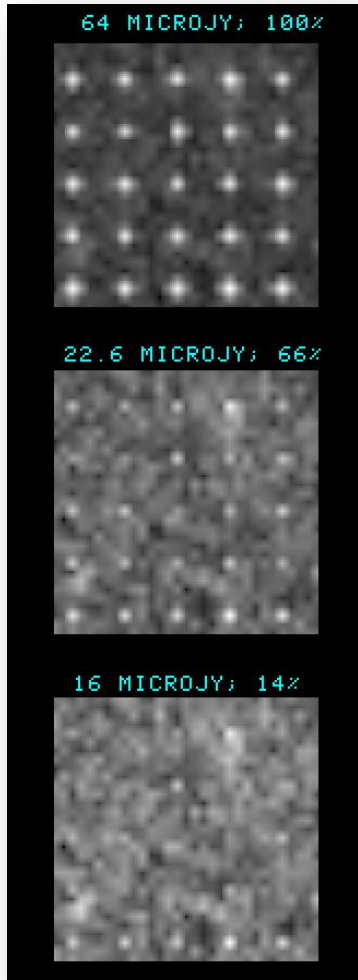


Completeness

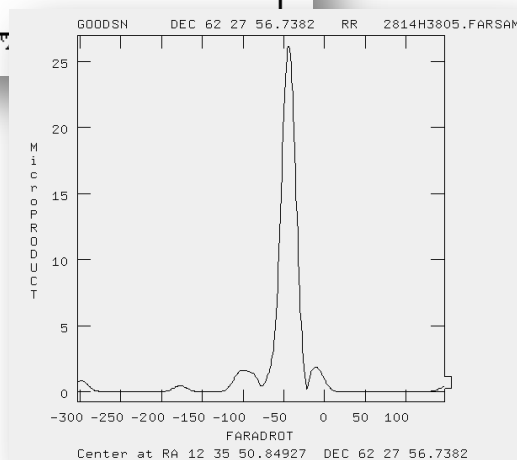
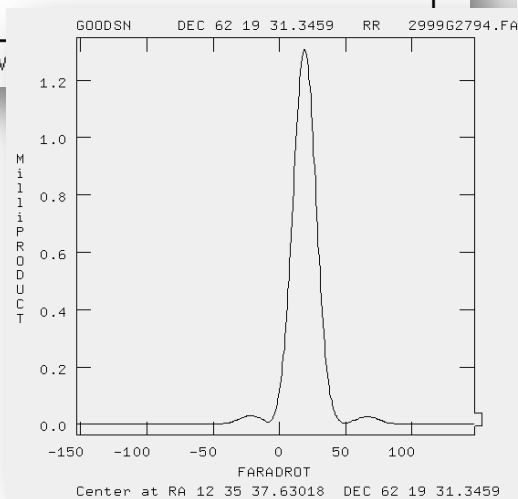
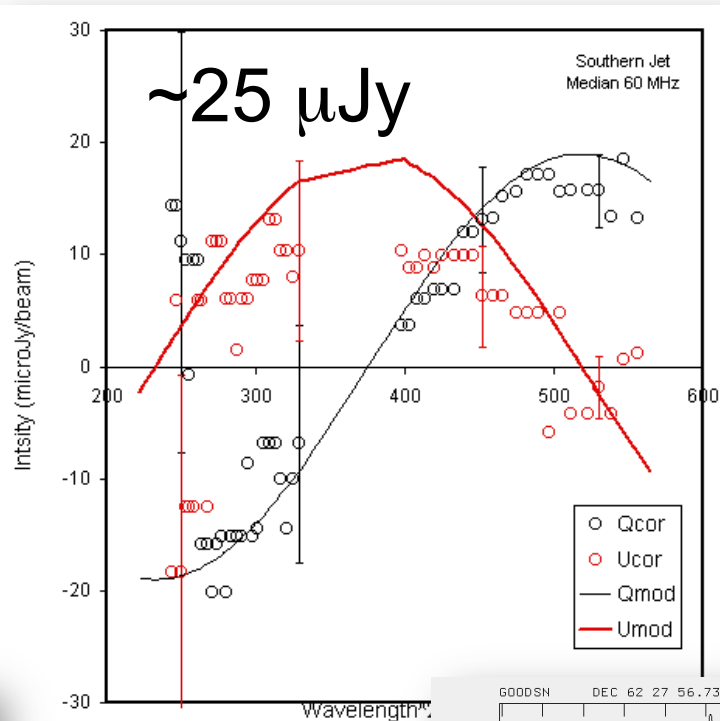
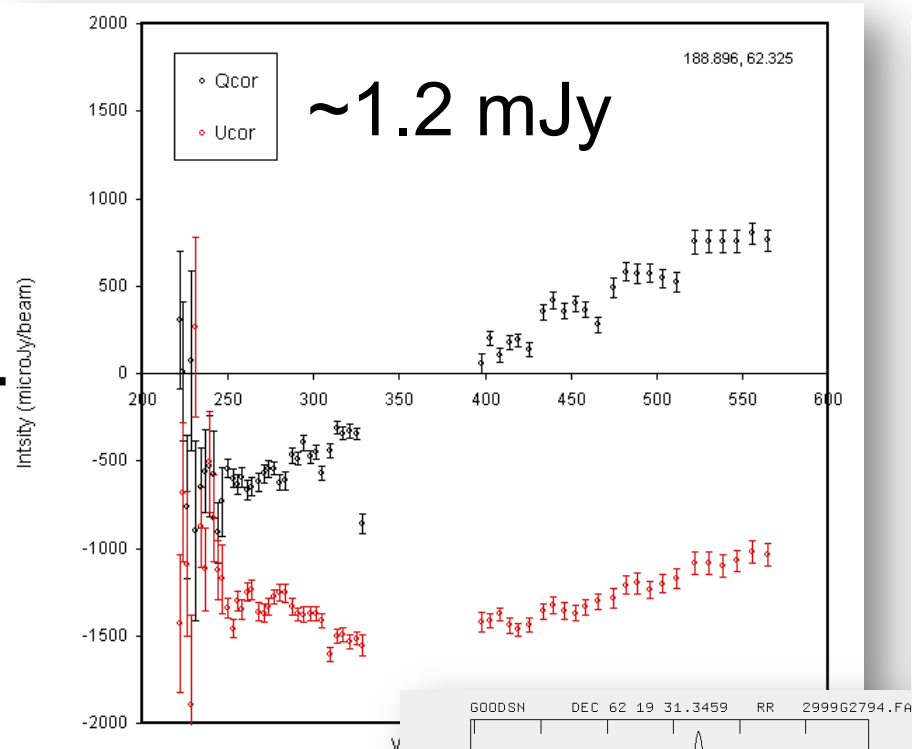
64 μJy

23 μJy

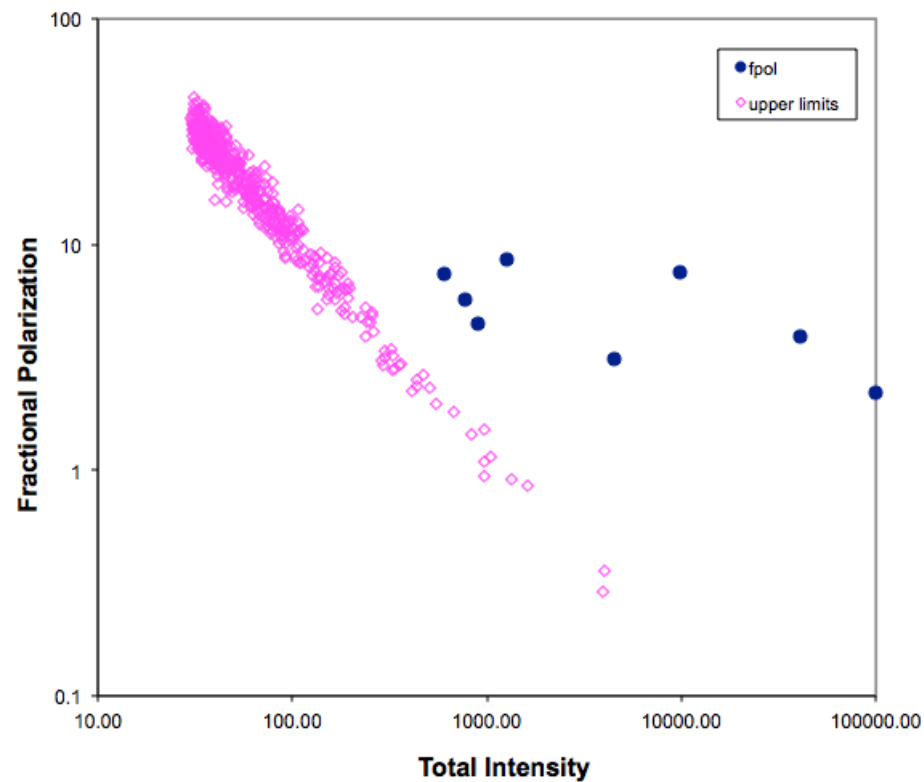
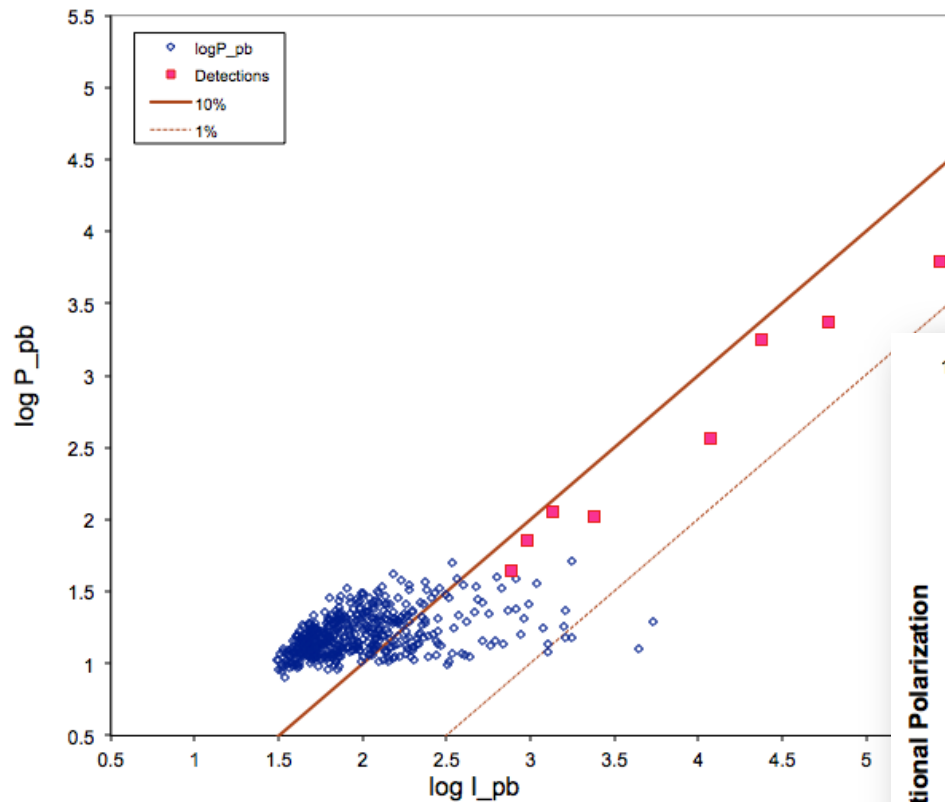
16 μJy

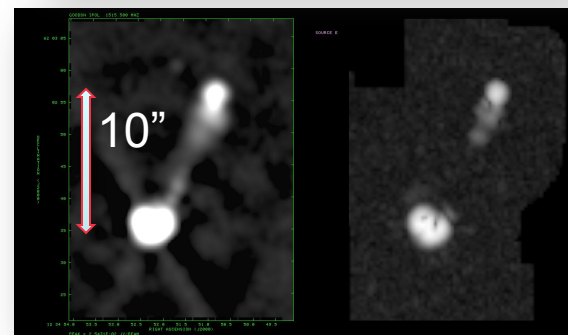
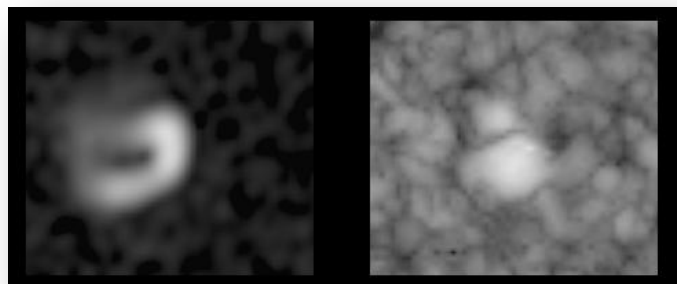
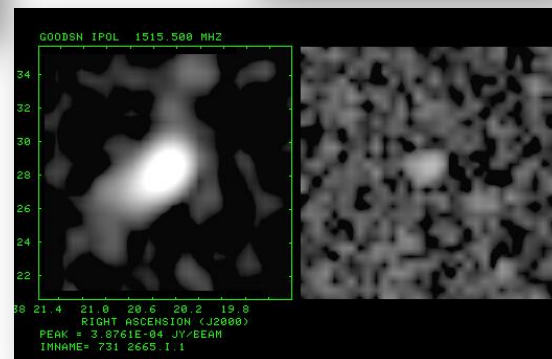
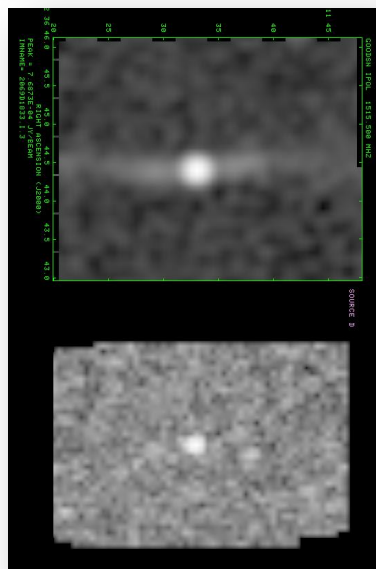
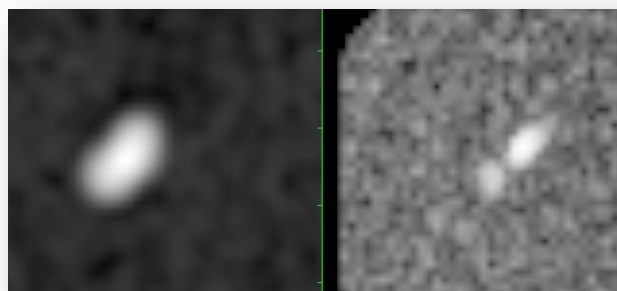
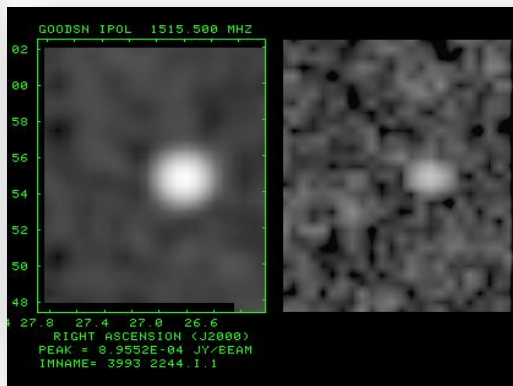
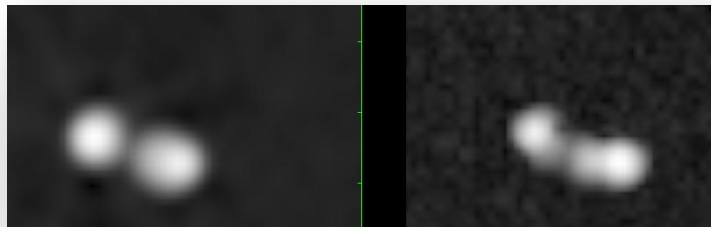
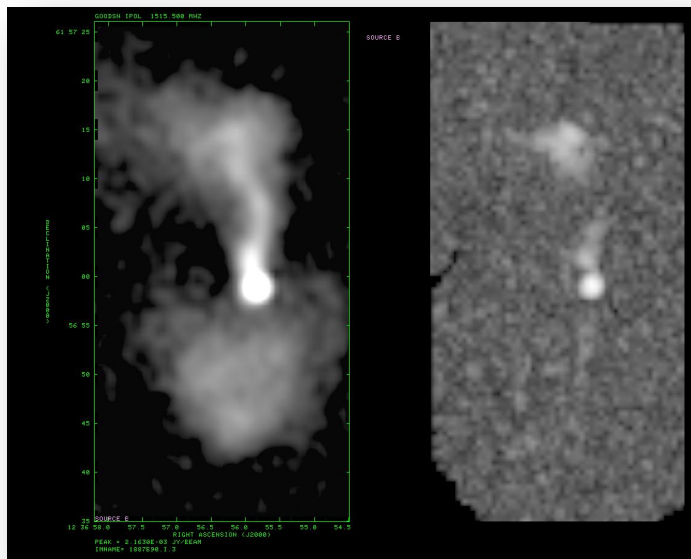


Q,U Data



What do we detect?





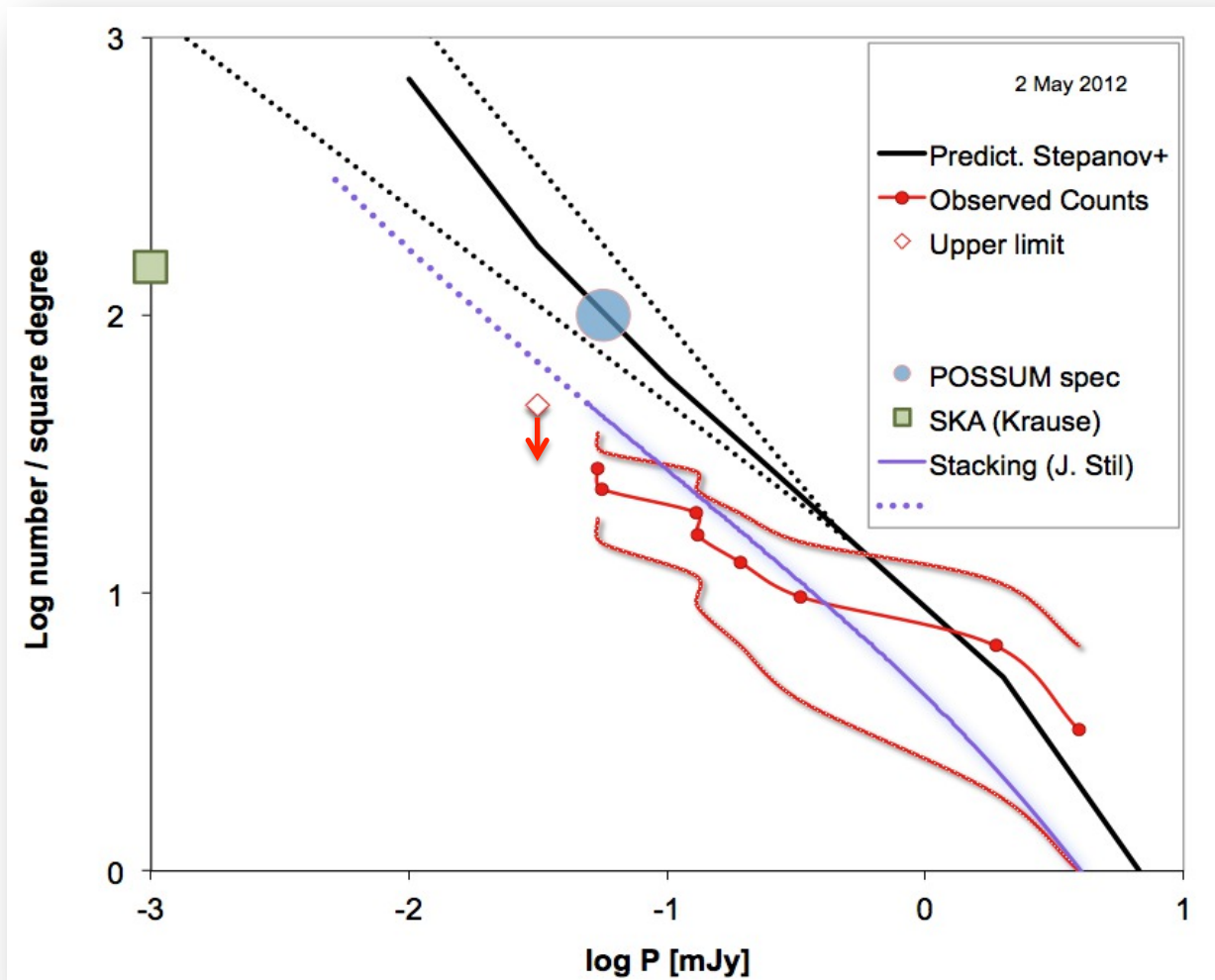


POSSUM Wisdom

Below 1mJy, polarized number counts fall dramatically below total intensity counts

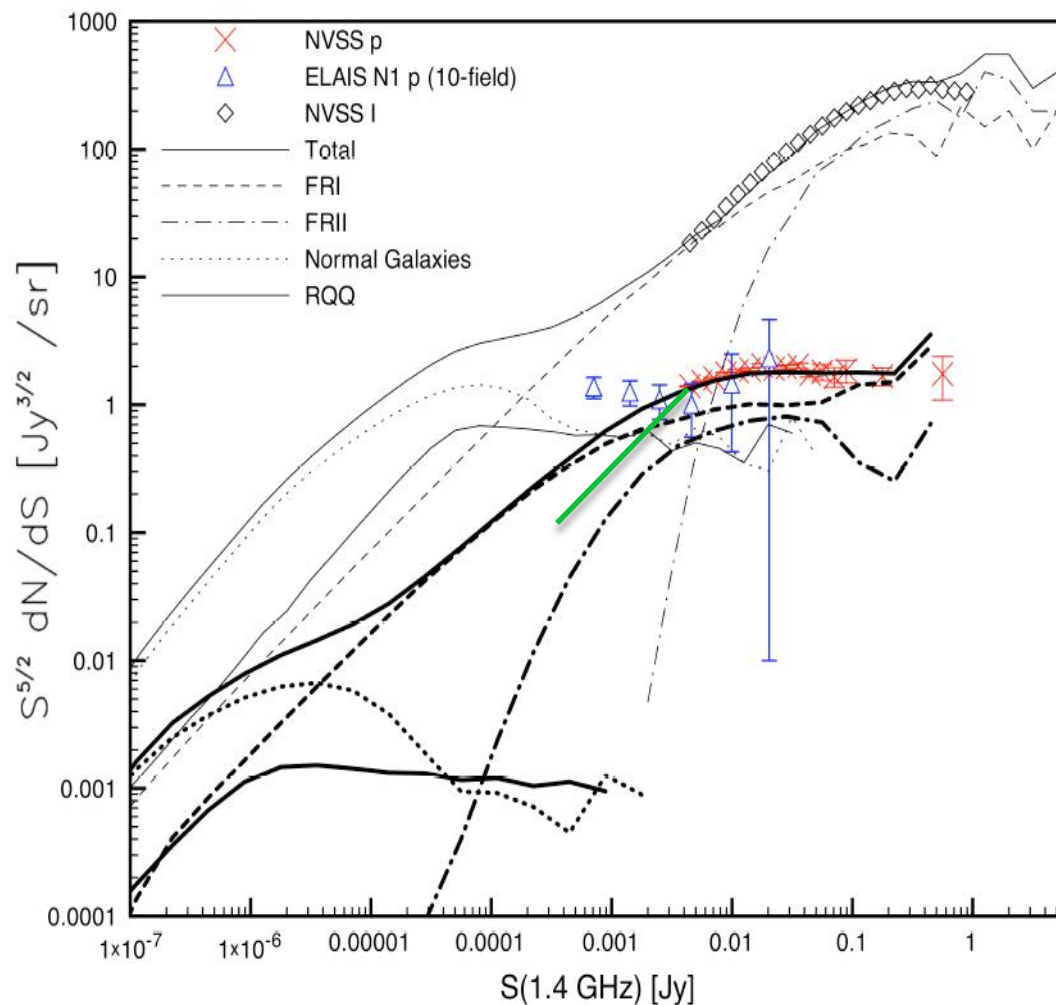
With $10\mu\text{Jy}$ sensitivity, most polarized sources are strong (mJy) and large ($\sim 10''$)

Number Counts

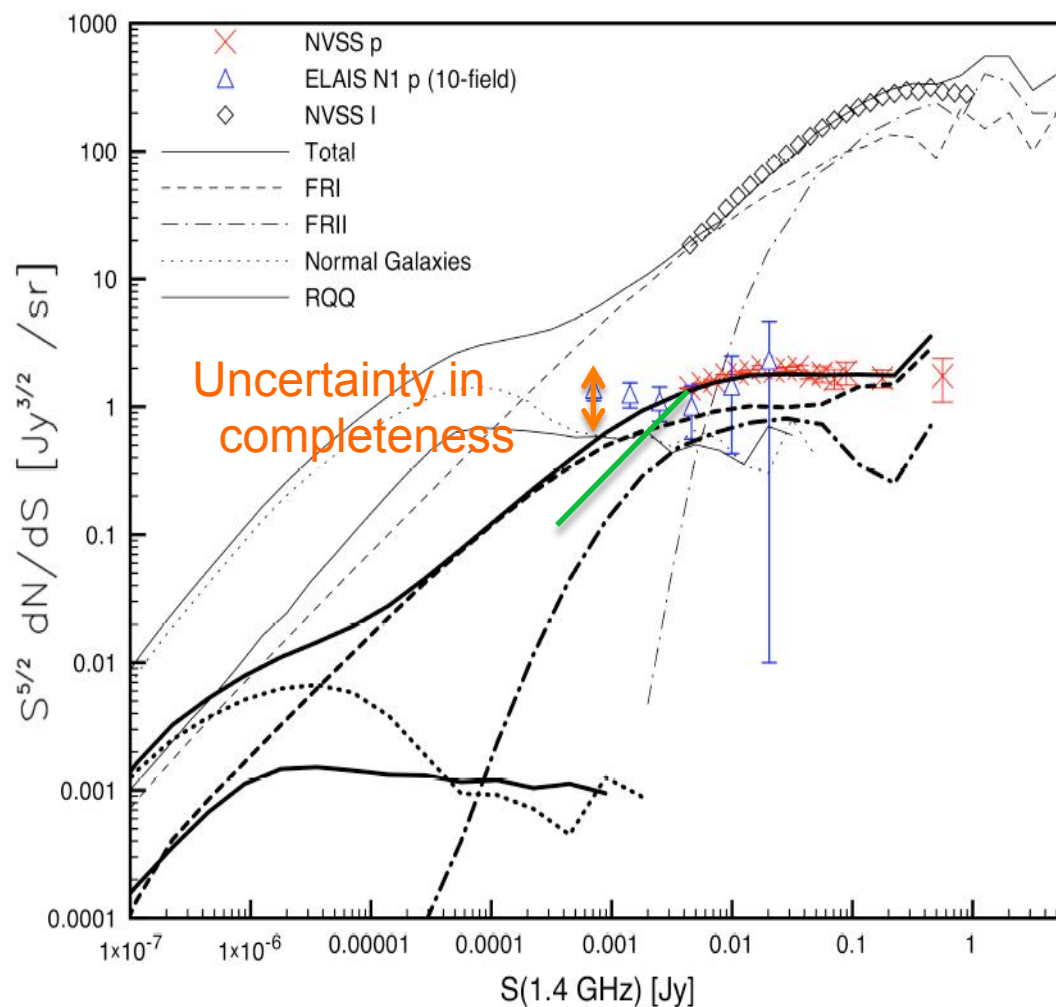


Polarized number counts fall dramatically...

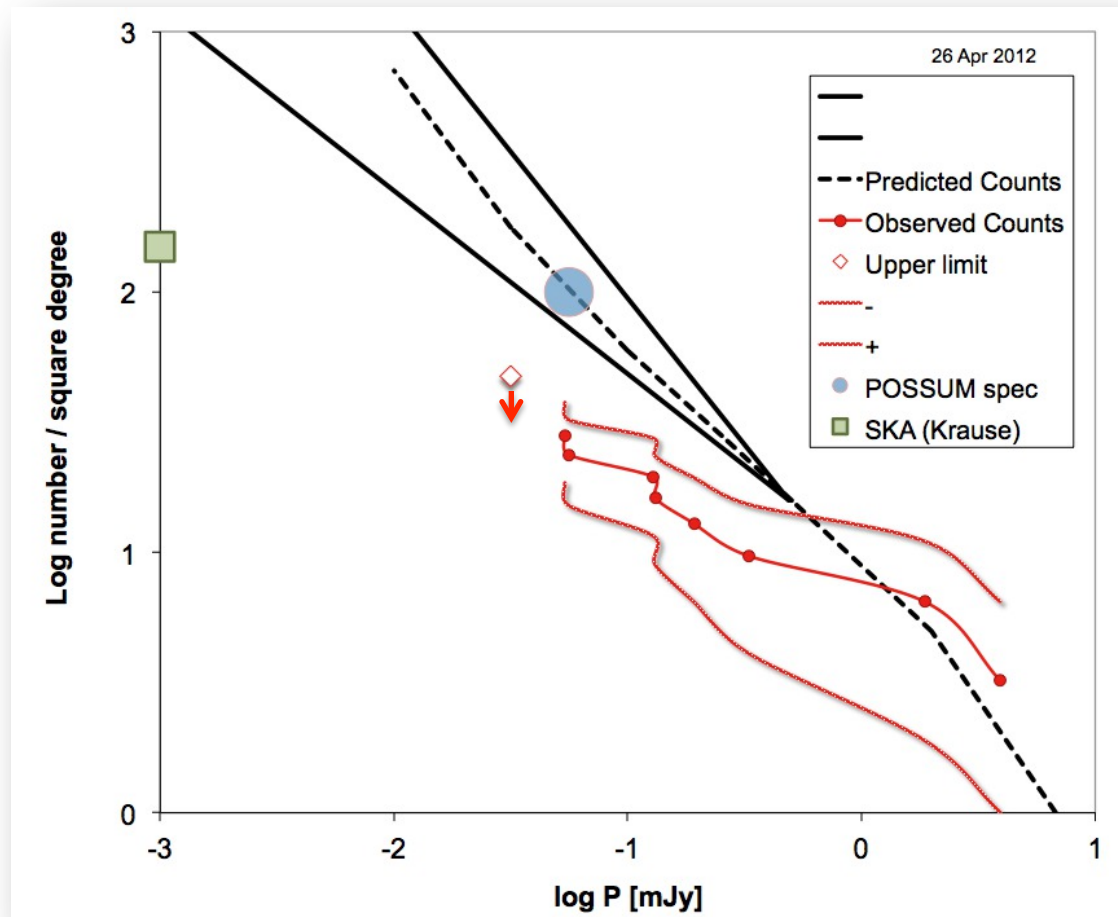
A *guess* at normalizing differential counts



A *guess* at normalizing differential counts



Number Counts

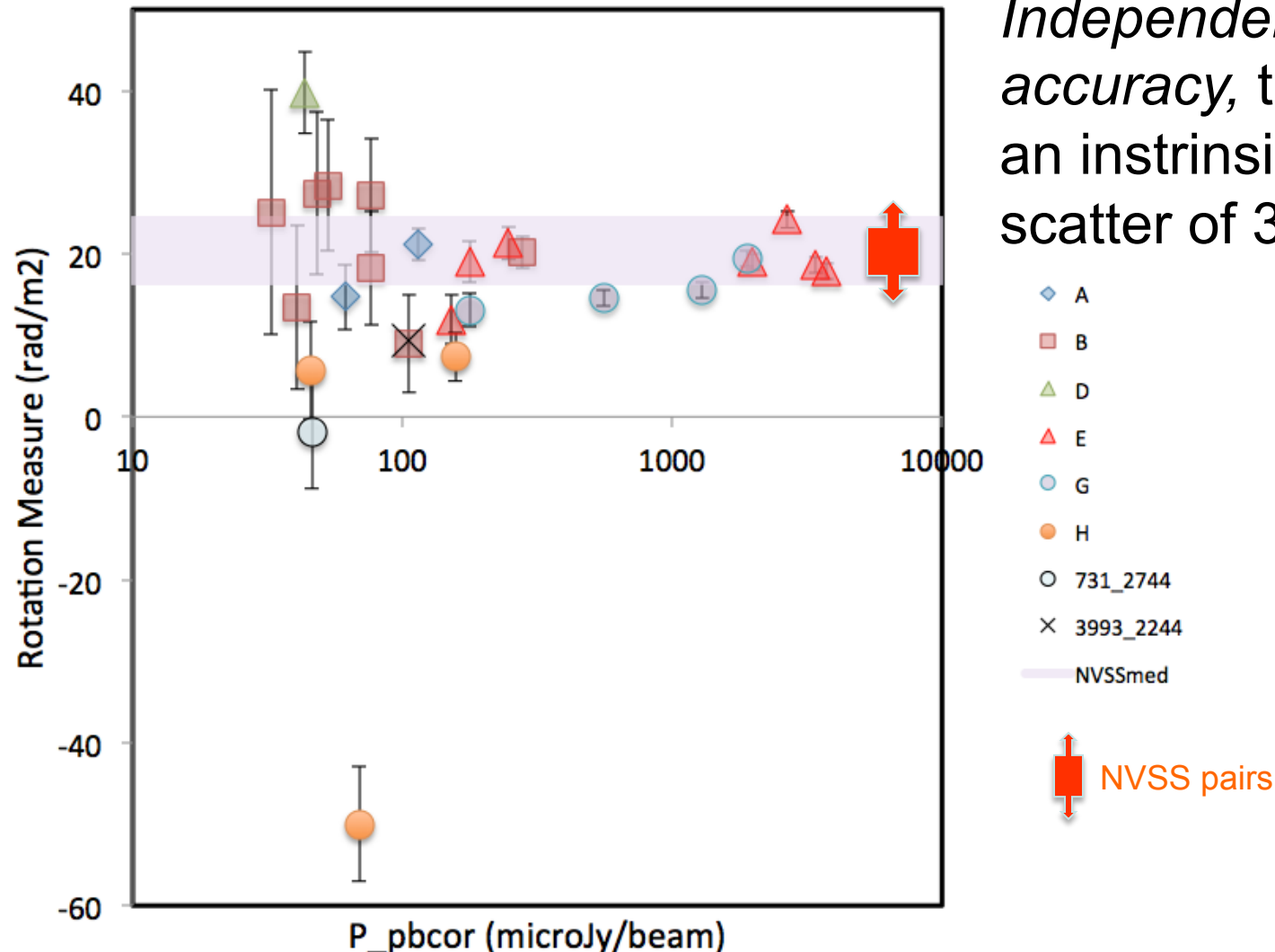


POSSUM likely to detect 20-30 sources/square degree
($< \sim 50\text{-}100\mu\text{Jy}$)

RM Distribution

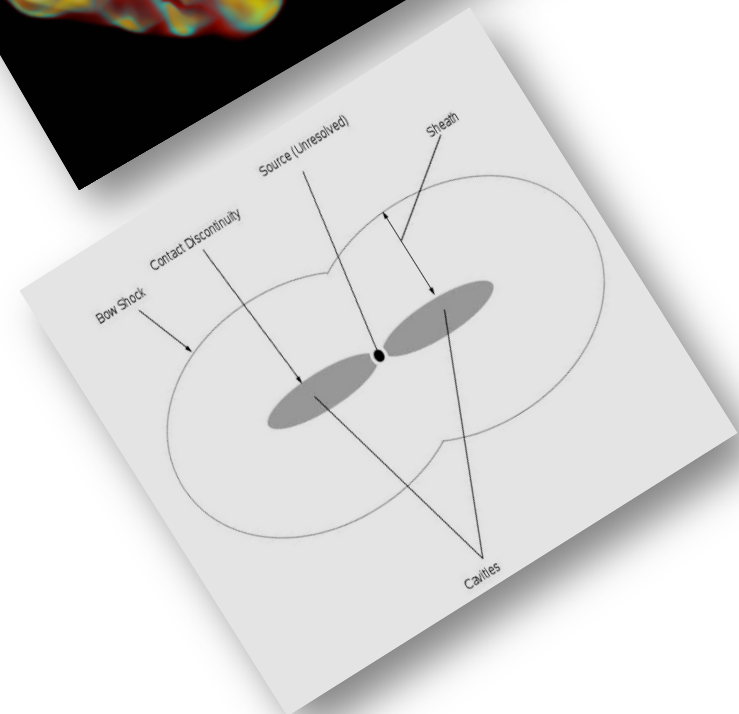
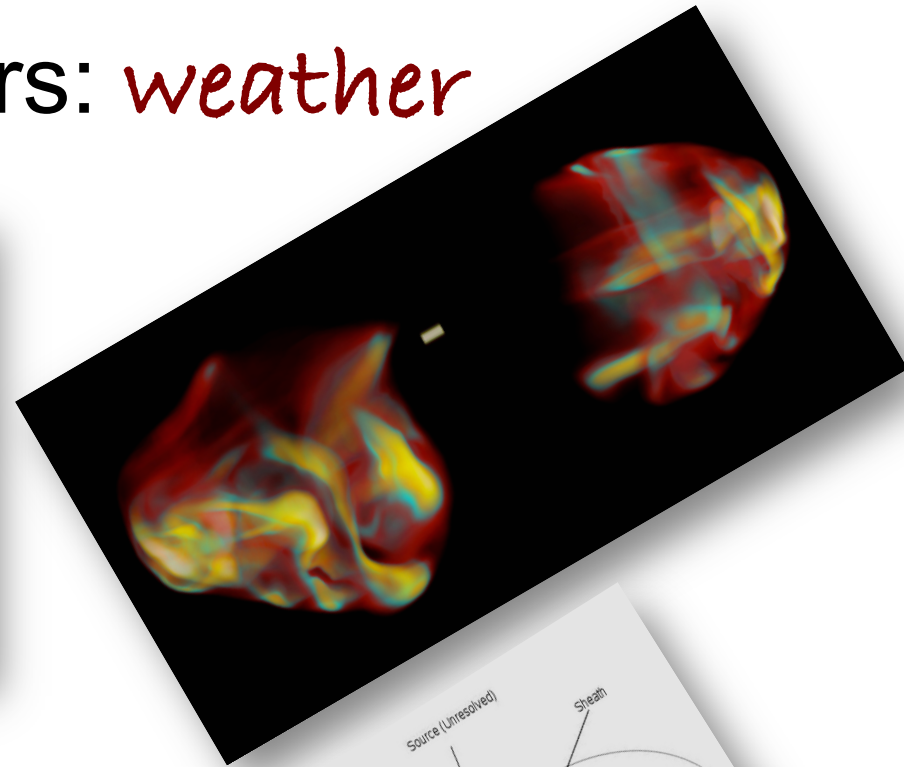
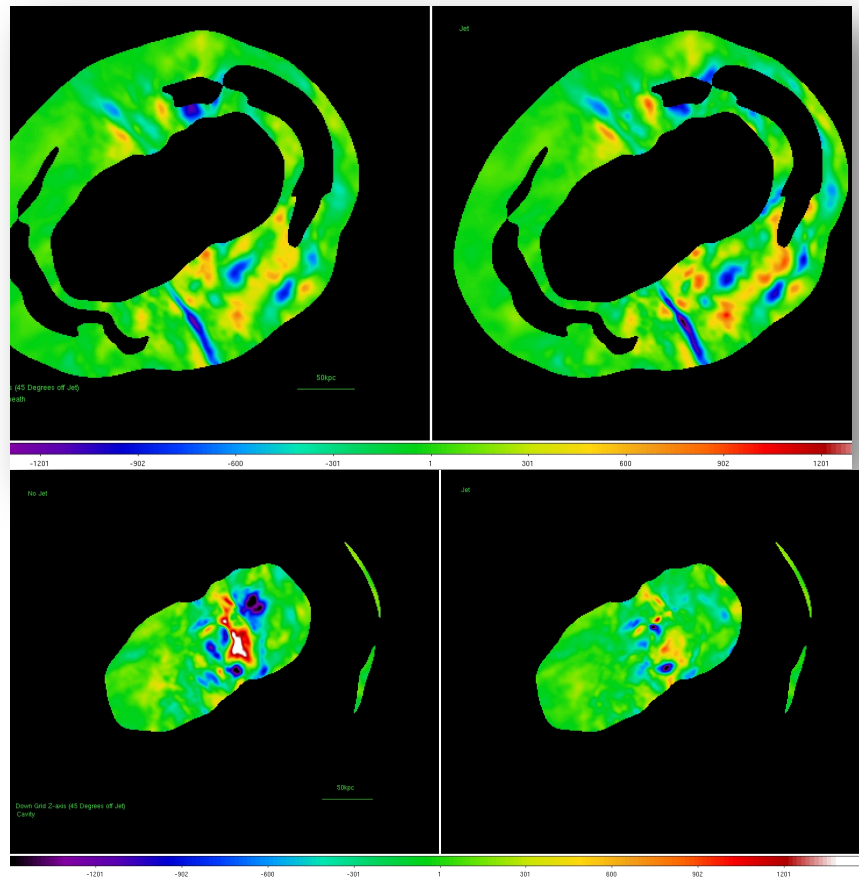


Independent of RM accuracy, there will be an intrinsic RM scatter of 3-5 rad/m²



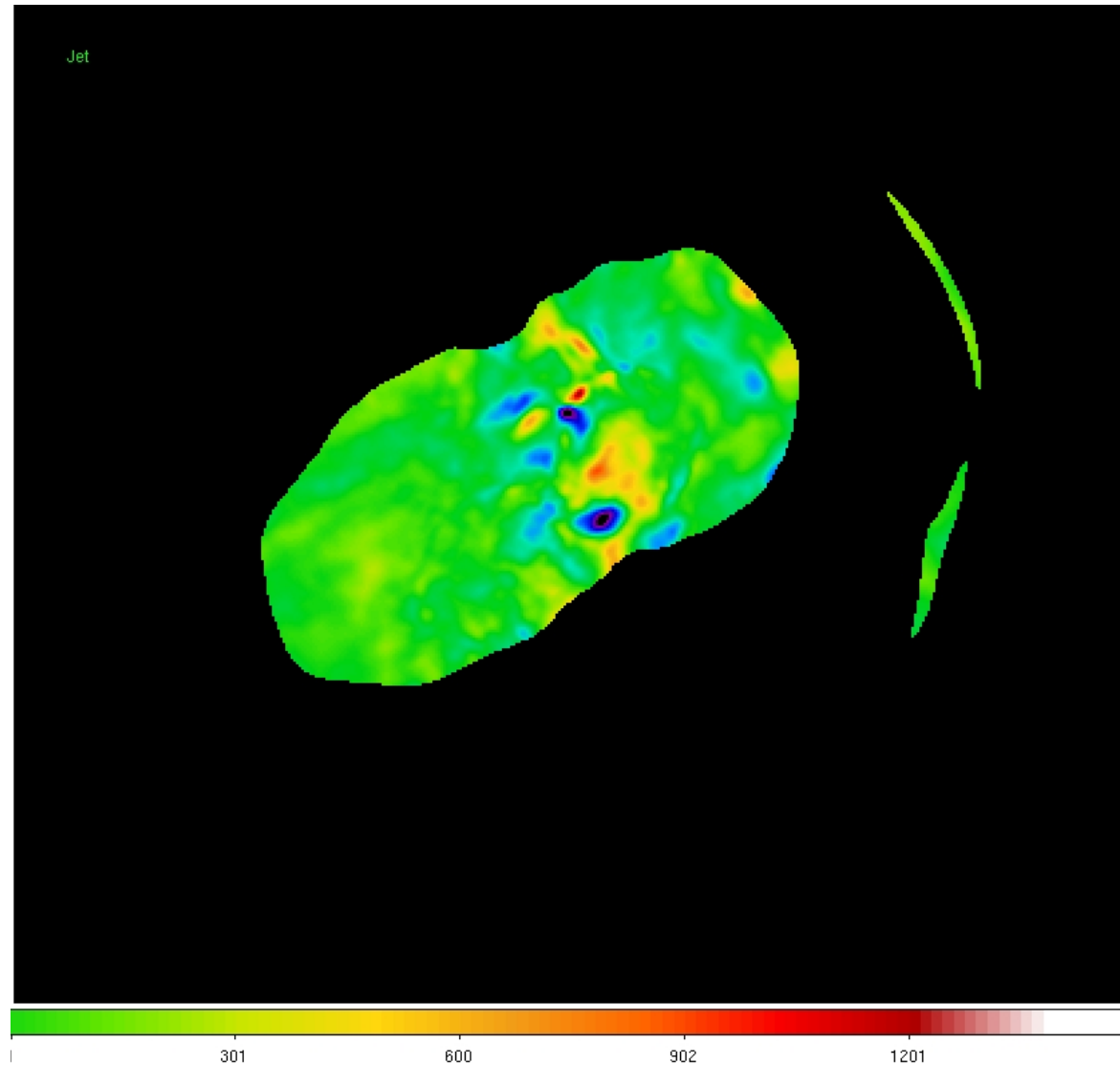
Simulations of Sources

Embedded in clusters: *weather*

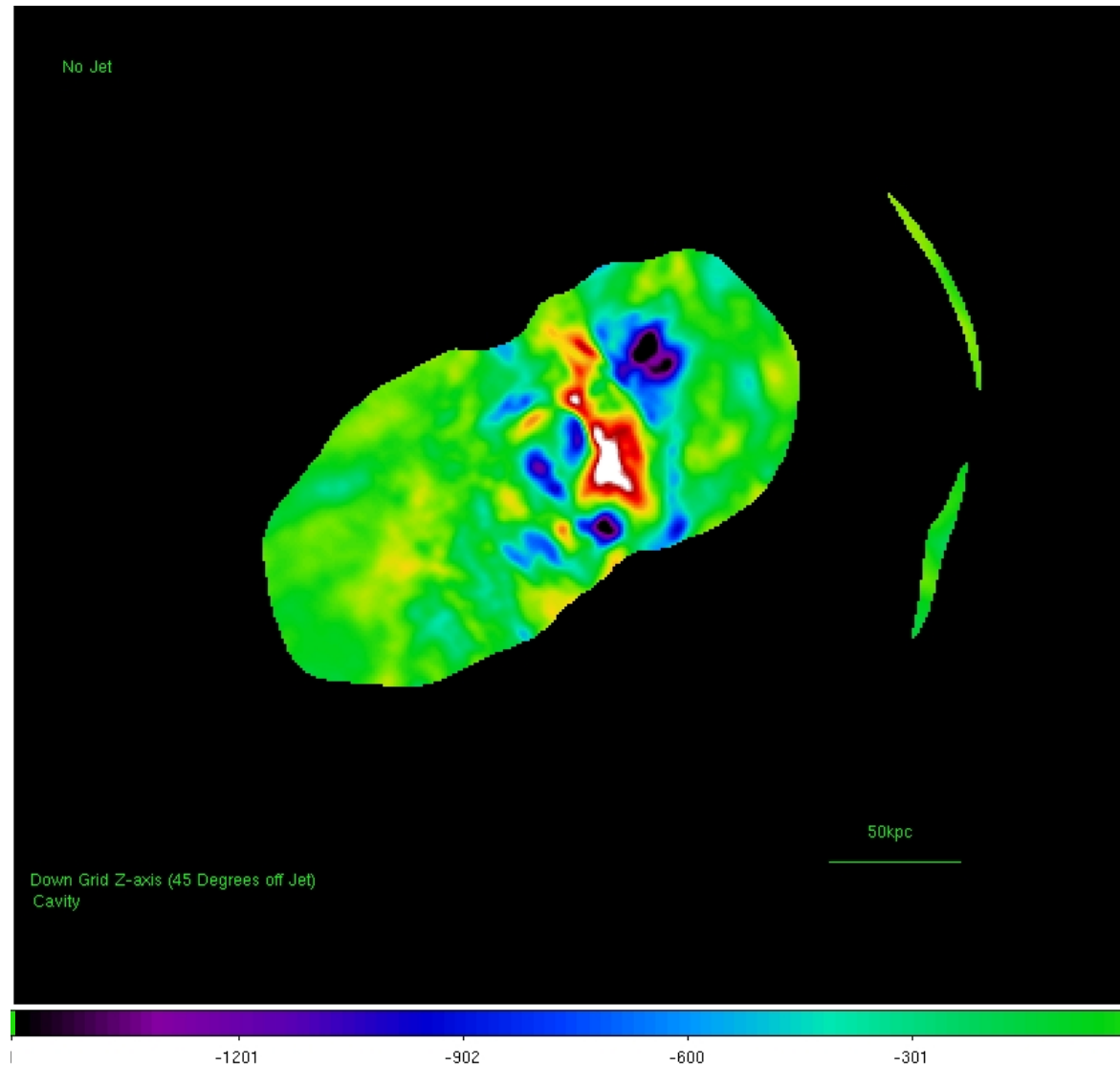


Andrew Johnson, Tom Jones, Pete Mendygral
Klaus Dolag

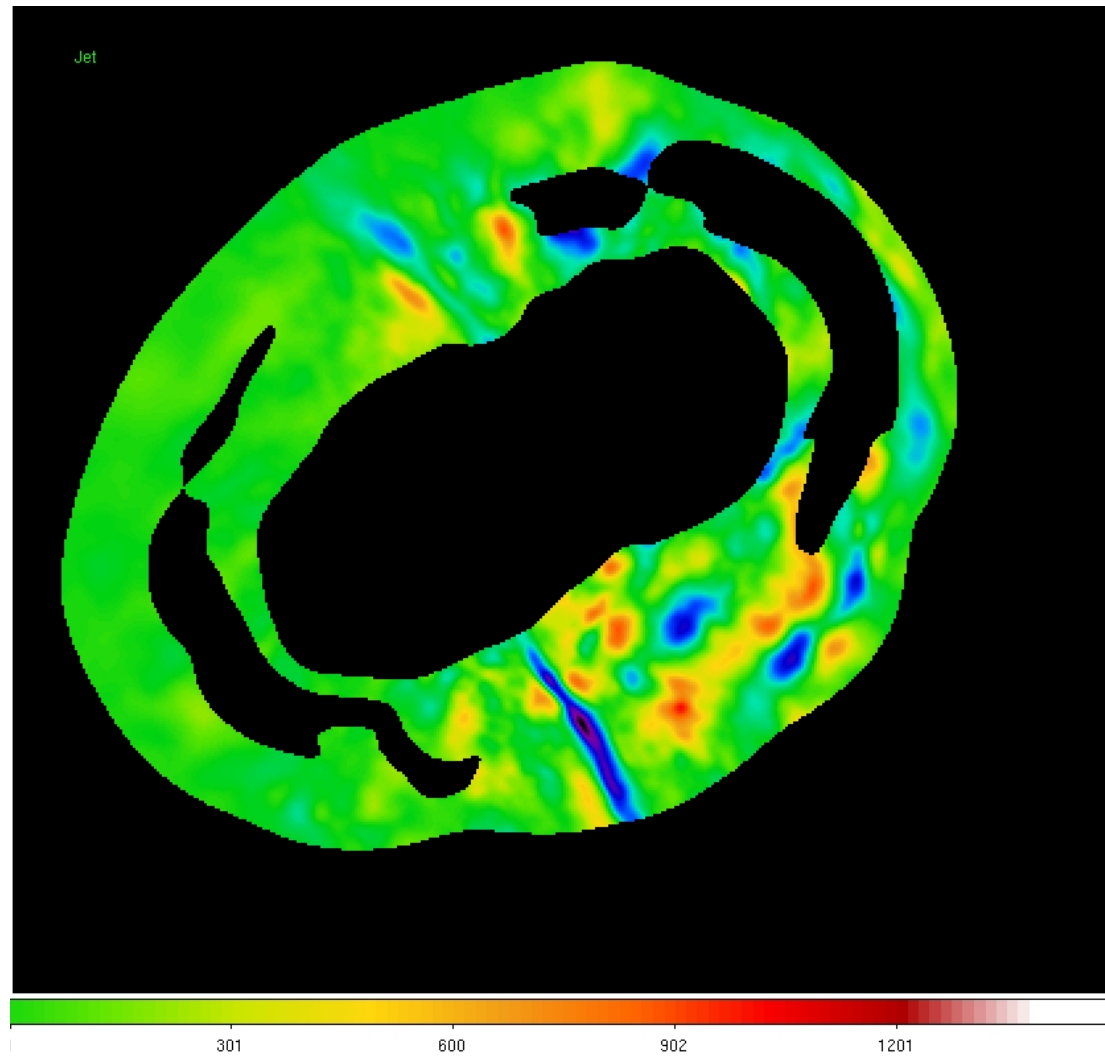
Synchrotron emitting region



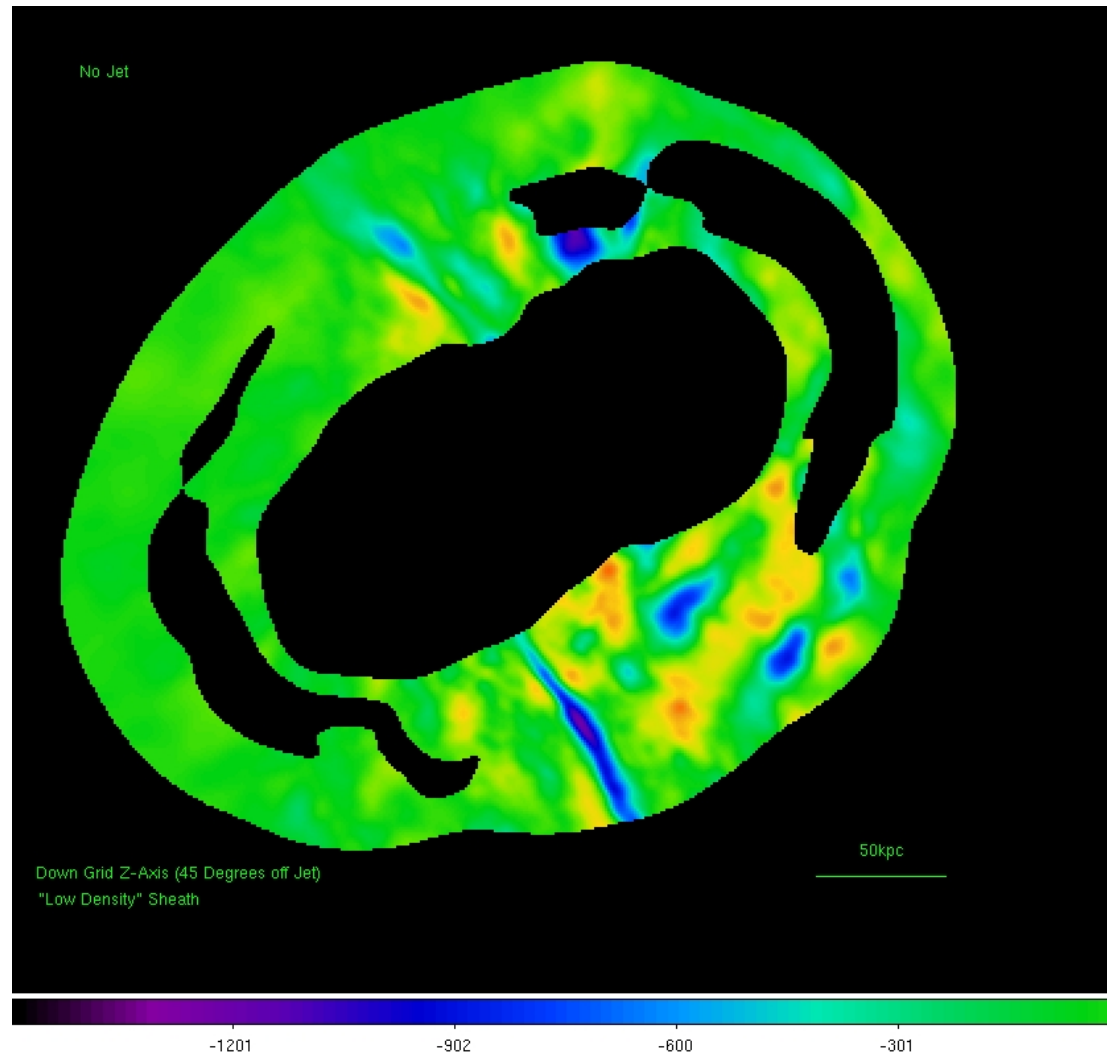
Synchrotron emitting region



Compressed sheath region

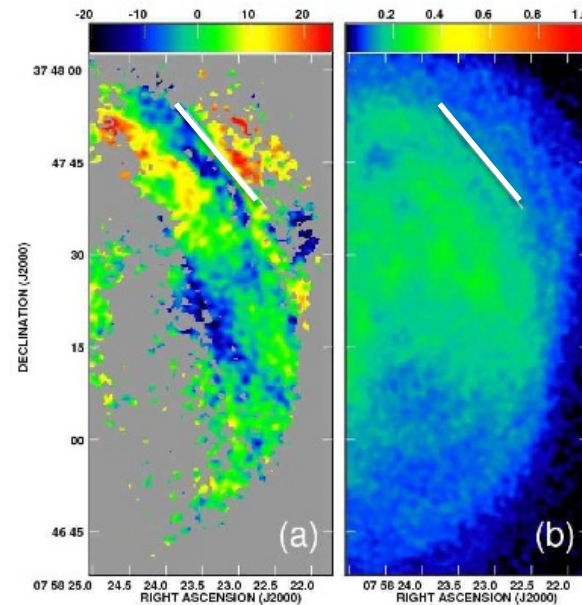
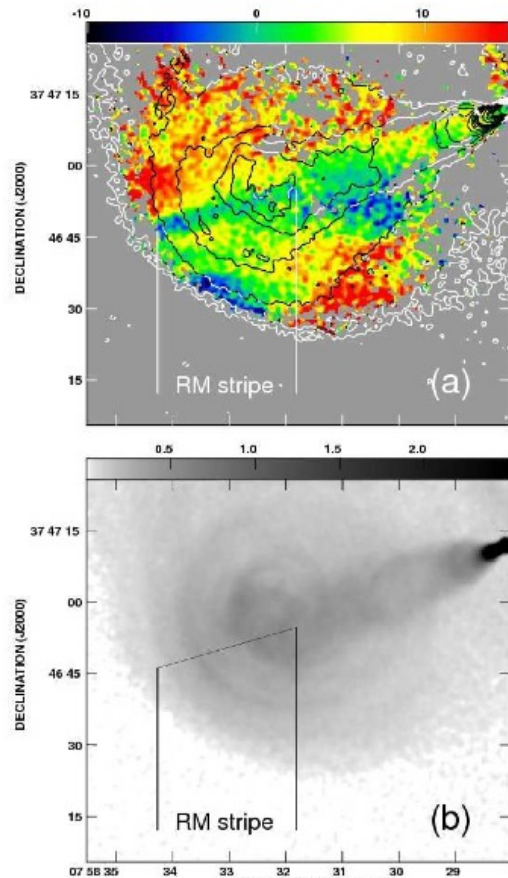


Compressed sheath region



Observed RMs & source structure

8 *D. Guidetti et al. Astro-ph:1203.4582*



*Extended radio galaxies
probe BOTH foregrounds
and their own local RMs*



POSSUM Wisdom

Polarized number counts fall dramatically below total intensity counts below 1 mJy (20-30/sq. deg, POSSUM)

With $10\mu\text{Jy}$ sensitivity, most polarized sources are strong (mJy) and large ($\sim 10''$)

Independent of RM accuracy, there will be an intrinsic scatter of 3-5 rad/m²

Cluster-embedded sources reflect their own local contributions to the RM, in addition to the cluster's.