

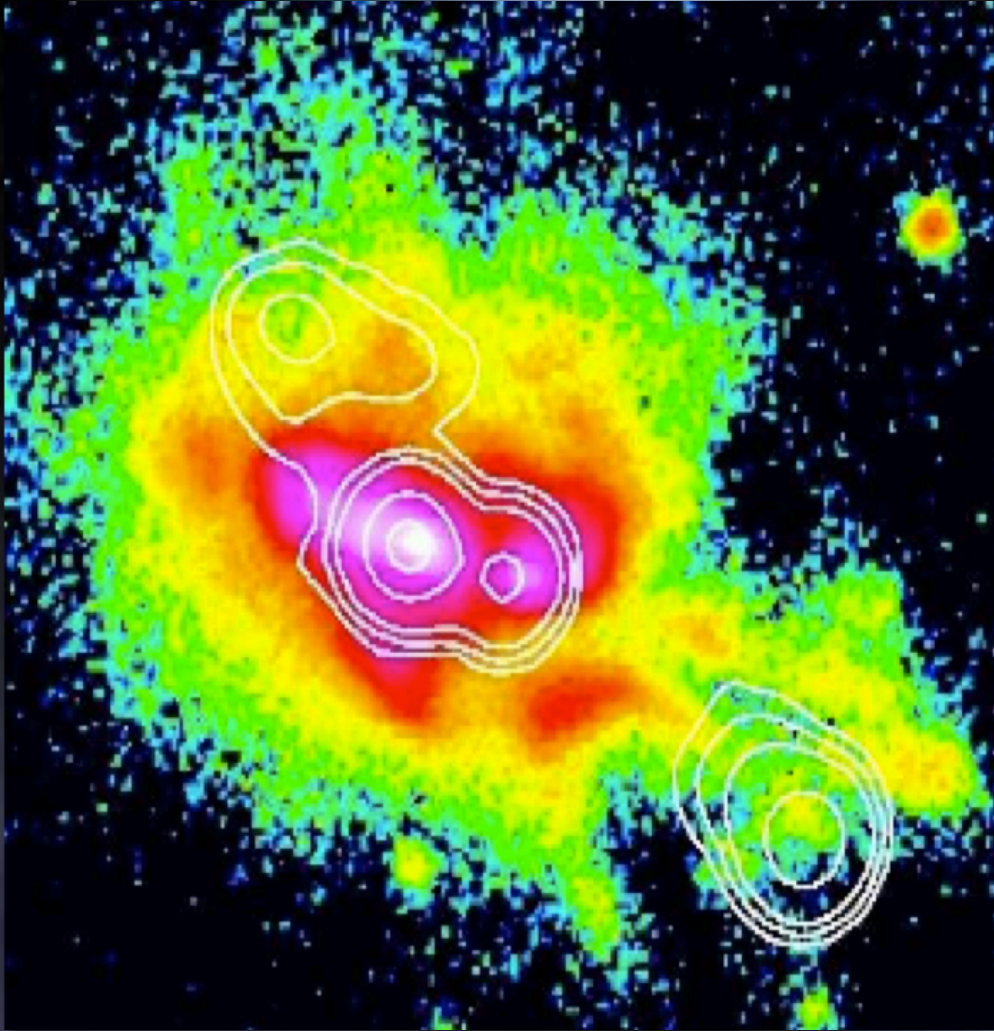


CARLA - CLUSTERS AROUND RADIO-LOUD AGN

Dominika Wylezalek (ESO)

Carlos De Breuck (ESO), Joël Vernet (ESO),
Daniel Stern (JPL), Audrey Galametz (INAF-OAR), Nick Seymour (CSIRO)

RADIO LOUD AGN



- $L_{500 \text{ MHz}} > 10^{27.5} \text{ W Hz}^{-1}$
- Largest, most luminous, most massive galaxies ($\sim 10^{11-11.5} M_{\odot}$, e.g. Seymour et al., 2007)
- Robust signposts of large scale structure ($\sim 75\%$ of high-z radio galaxies in protoclusters, Venemans et al., 2007)

Radio structure of 4C41.17 ($z=3.8$)
(Reuland et al., 2003)

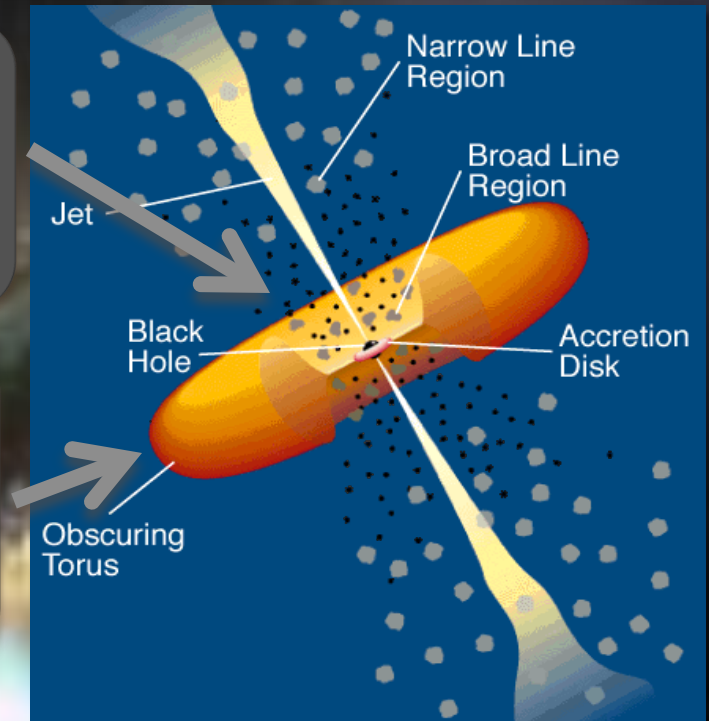


RADIO LOUD AGN – UNIFICATION

TYPE I :
RADIO LOUD QUASARS

TYPE II :
RADIO GALAXIES

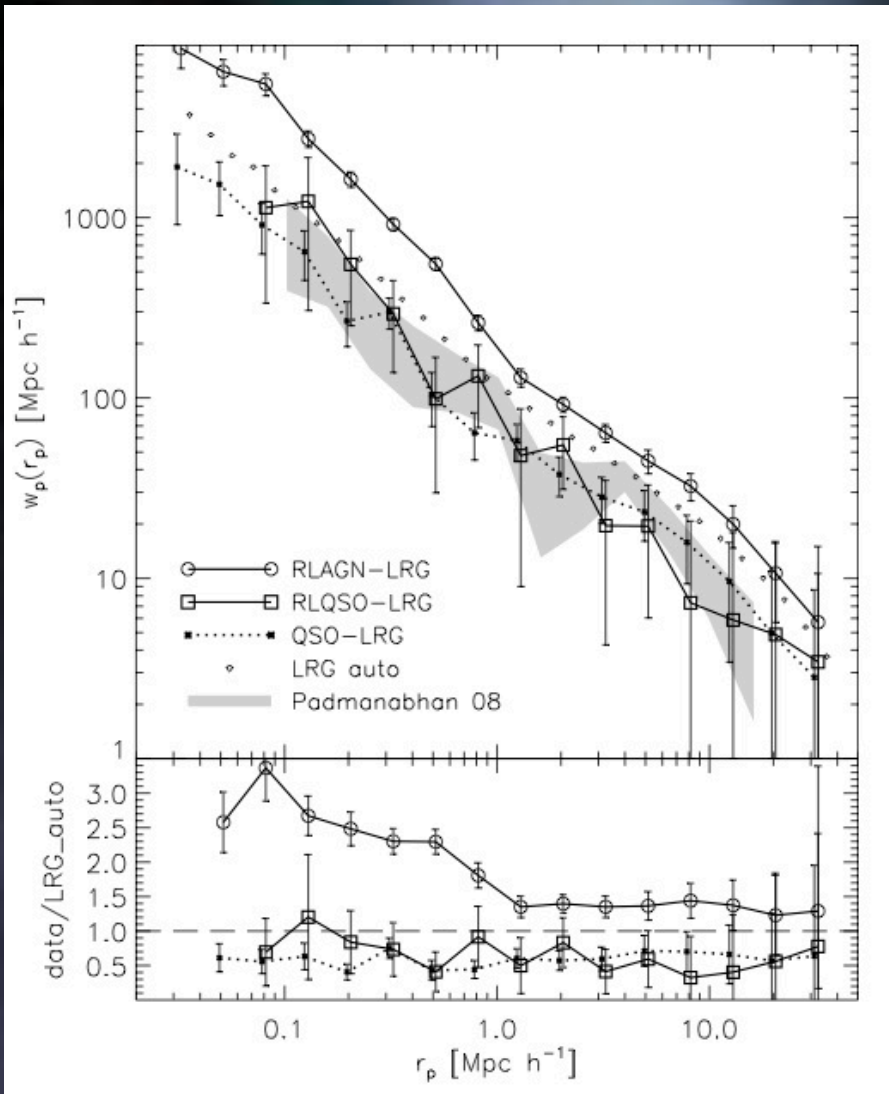
EVOLUTION?



Urry&Padovani, 1995



RADIO LOUD AGN – ENVIRONMENTS

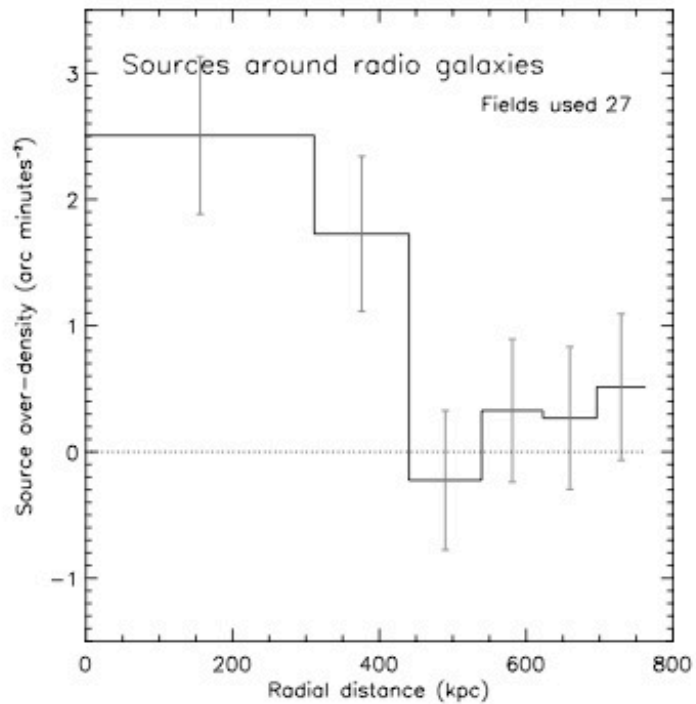
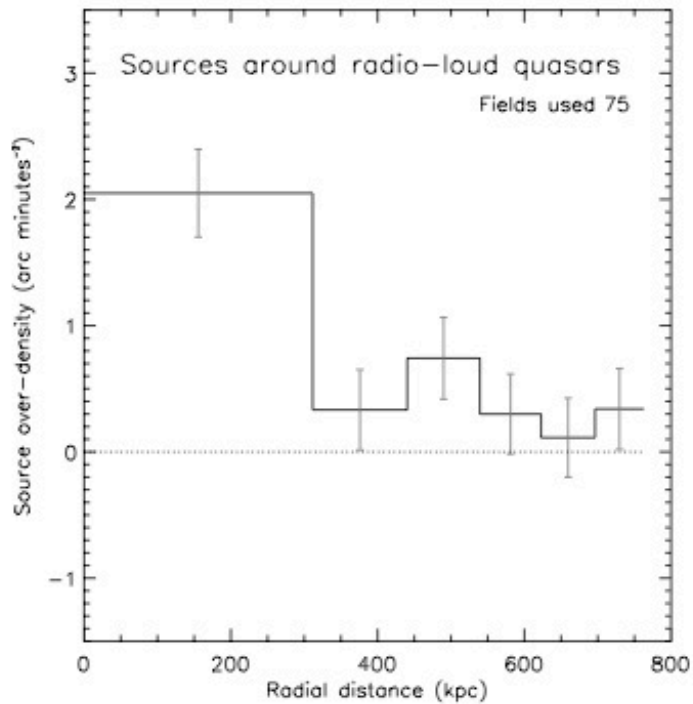


Stronger clustering for radio galaxies compared to radio-loud quasars

Donoso et al., 2010



RADIO LOUD AGN – ENVIRONMENTS



Falder et al., 2010 (see also: e.g., Smith&Heckman, 1990, Yates et al., 1989)

Similar environments
for radio galaxies and
radio-loud quasars



CARLA – CLUSTERS AROUND RADIO LOUD AGN

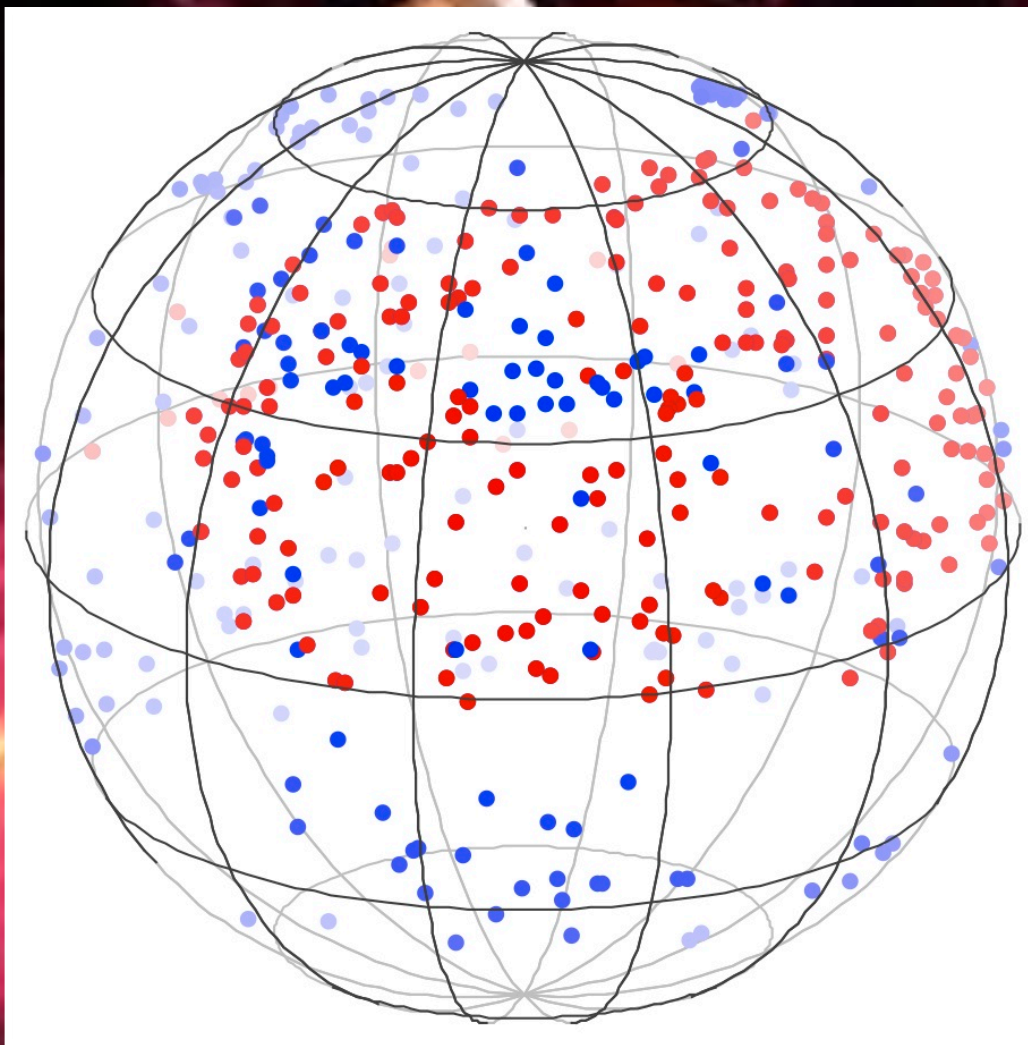
450 radio galaxies and
radio loud quasars

75% already observed

$1.3 < z < 3.2$



CARLA – TARGET SELECTION

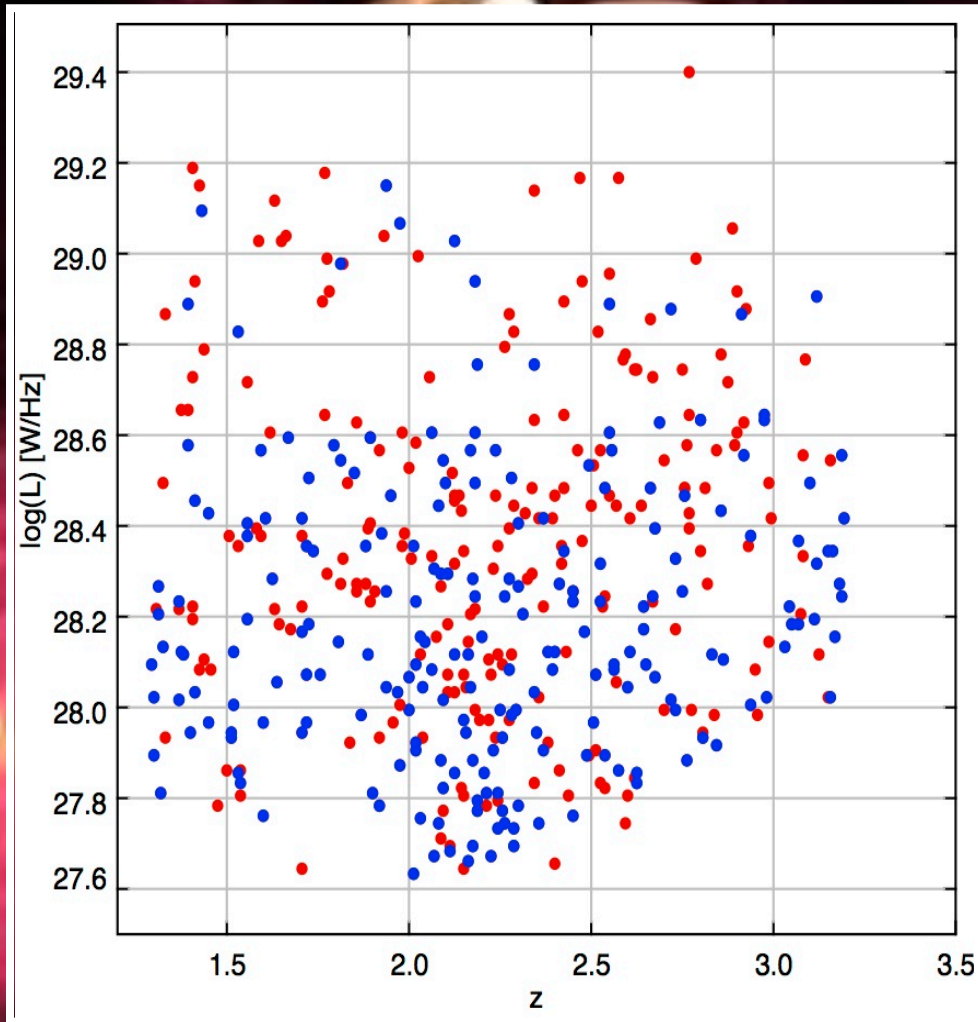


~230 radio galaxies
~230 radio-loud quasars

Well distributed over
the sky



CARLA – TARGET SELECTION



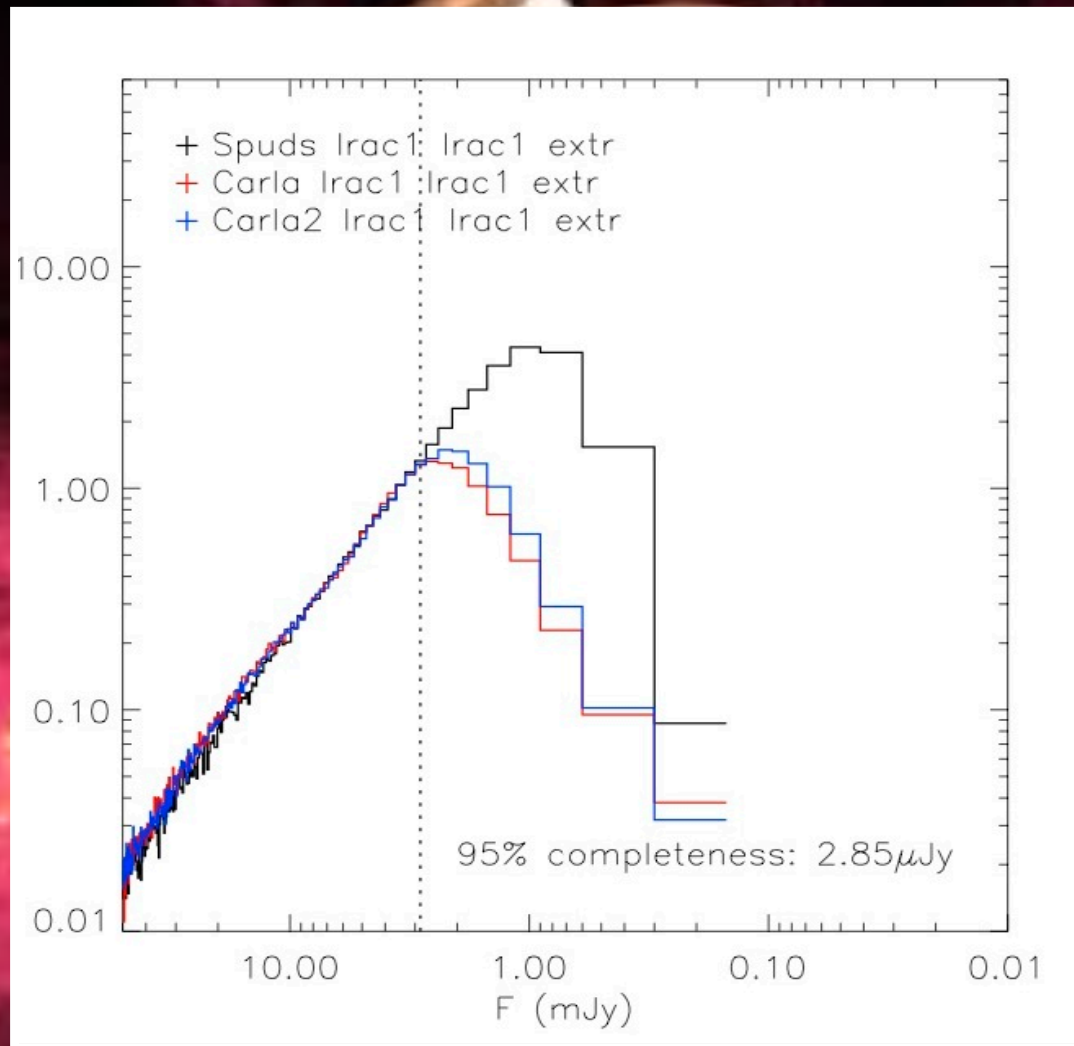
~230 radio galaxies
~230 radio-loud quasars

Well distributed over
the sky

matching sets in z ,
 $L_{500 \text{ MHz}}$



CARLA – TARGET SELECTION



~230 radio galaxies
~230 radio-loud quasars

Well distributed over
the sky

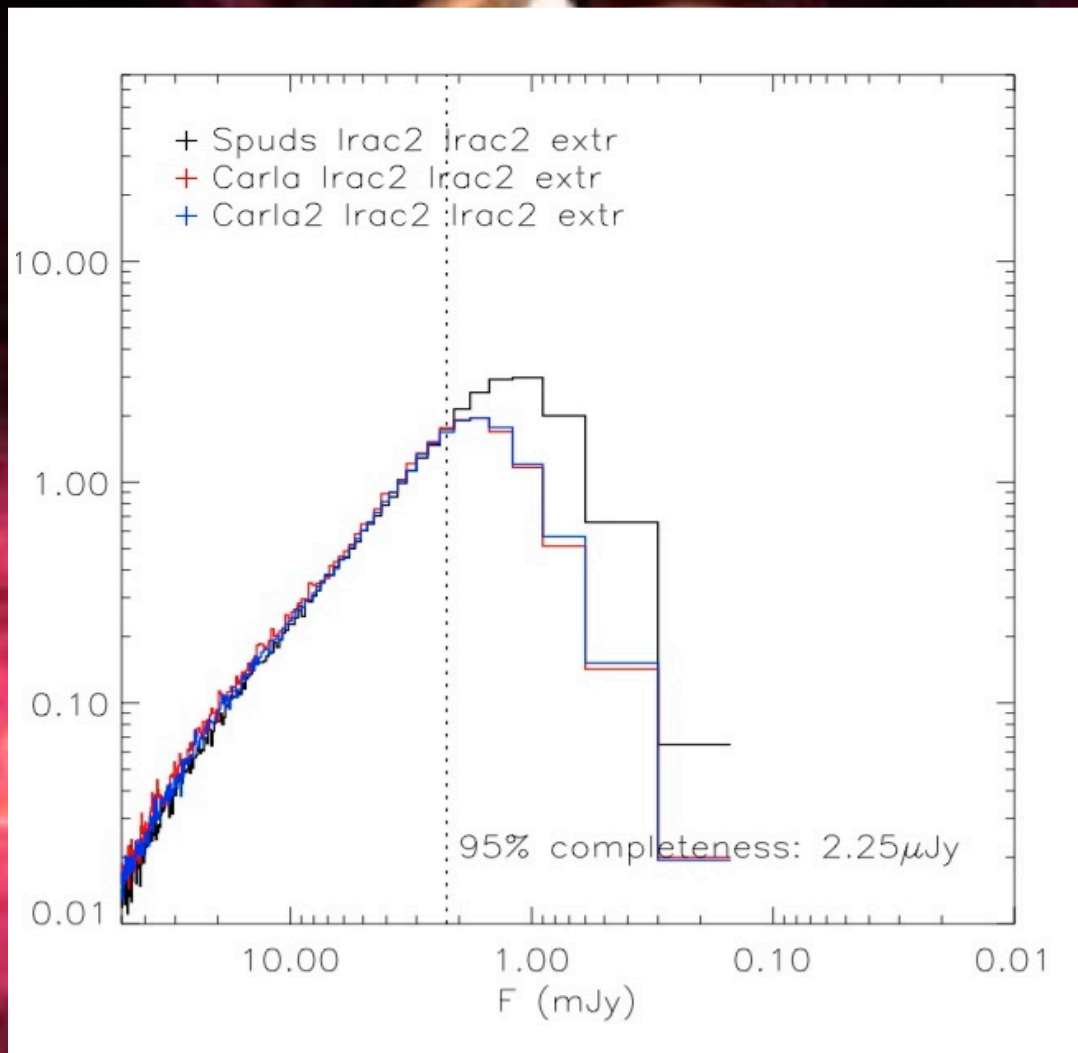
matching sets in z ,
 $L_{500 \text{ MHz}}$

95% completeness:
 $[3.6]_{AB} = 22.8$
 $[4.5]_{AB} = 23.0$

Exposure time:
1000/2000s



CARLA – TARGET SELECTION



~230 radio galaxies
~230 radio-loud quasars

Well distributed over
the sky

matching sets in z ,
 $L_{500 \text{ MHz}}$

95% completeness:
 $[3.6]_{AB} = 22.8$
 $[4.5]_{AB} = 23.0$

Exposure time:
1000/2000s



CARLA – GOALS

Identify clusters at $z > 1.3$ using IRAC colors:
 $[3.6]_{AB} - [4.5]_{AB} > -0.1$

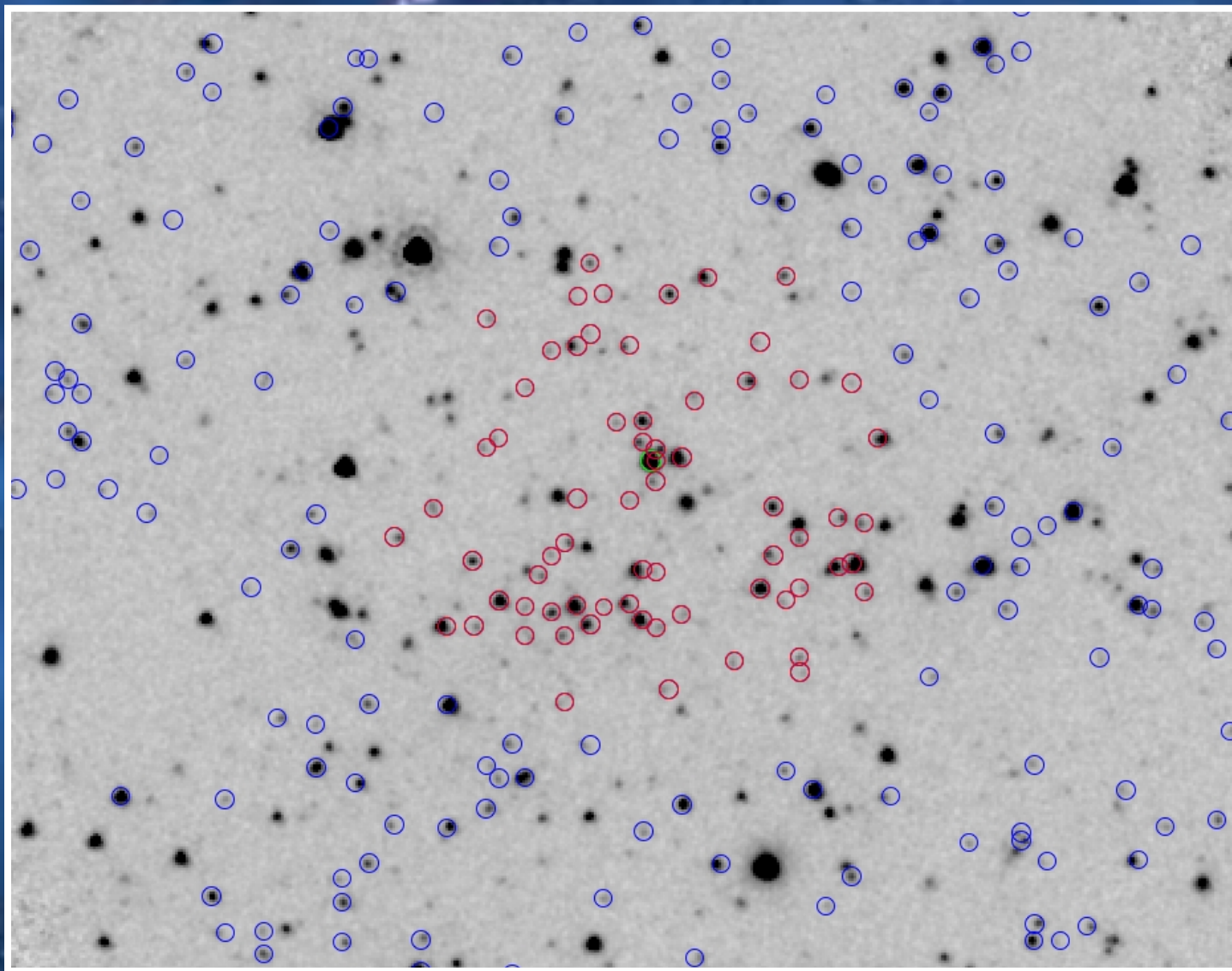
Study **correlation** between **overdensity**
and **radio power**

Study **correlation** between **overdensity**
and **AGN Type**

Determine **cluster luminosity function**
at $z > 1.3$ and measure m^* and α

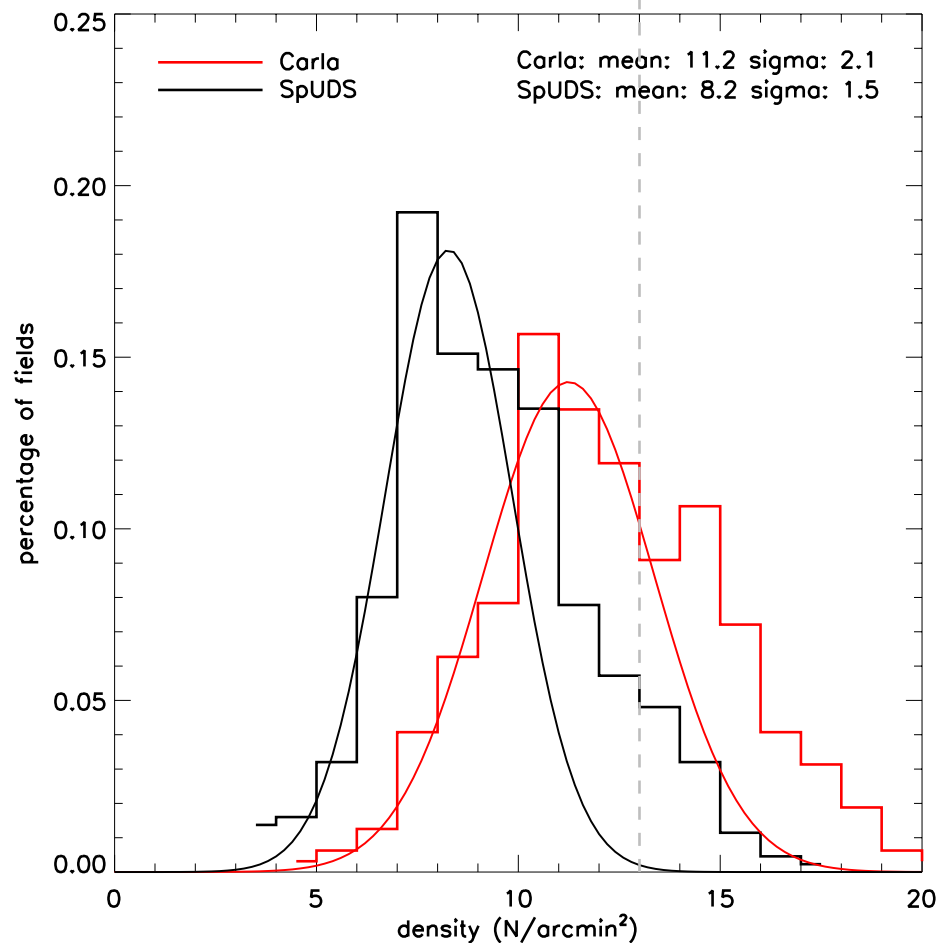


CARLA – FIRST RESULTS



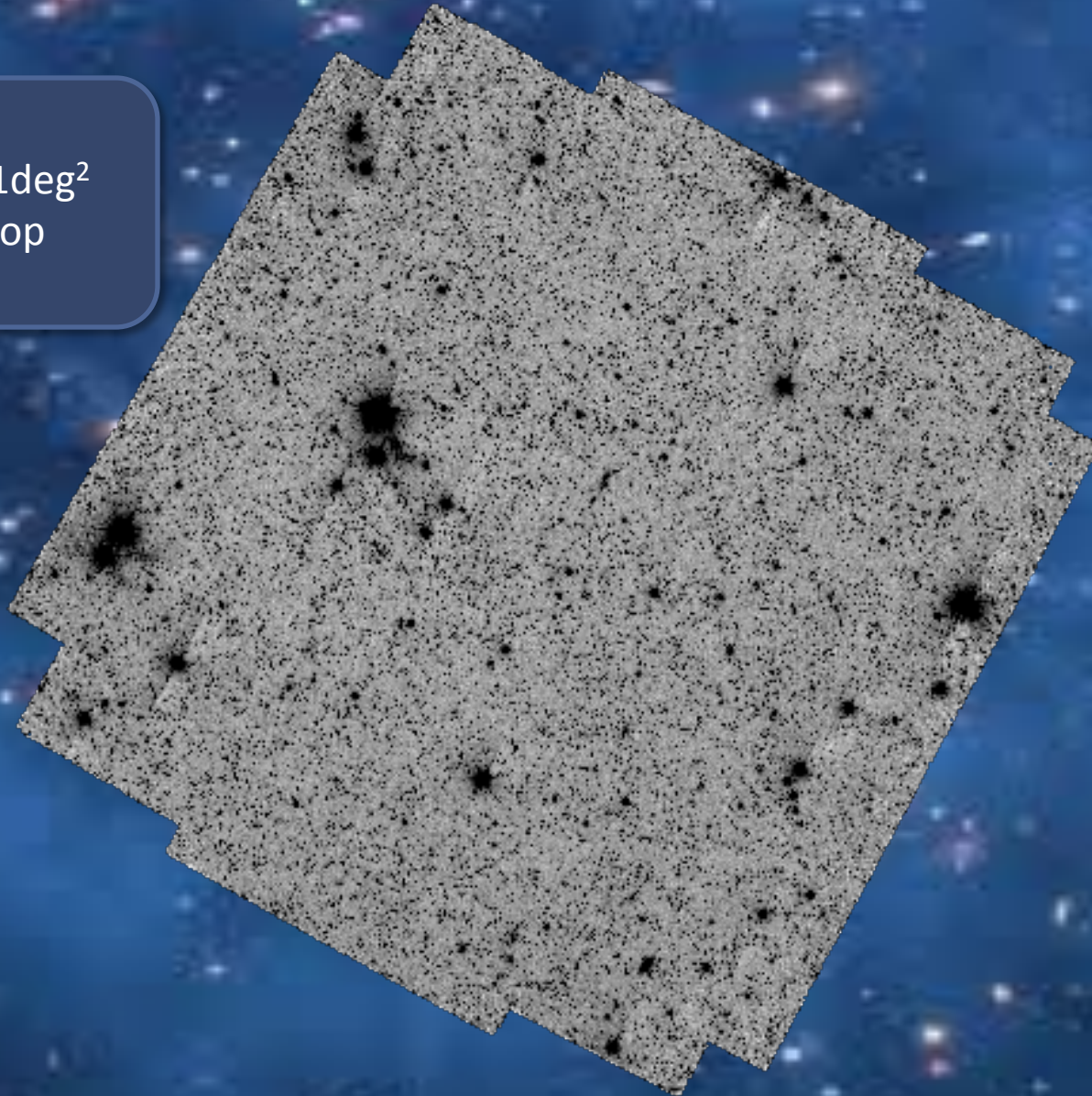
CARLA – FIRST RESULTS

CARLA fields are clearly denser than blank fields

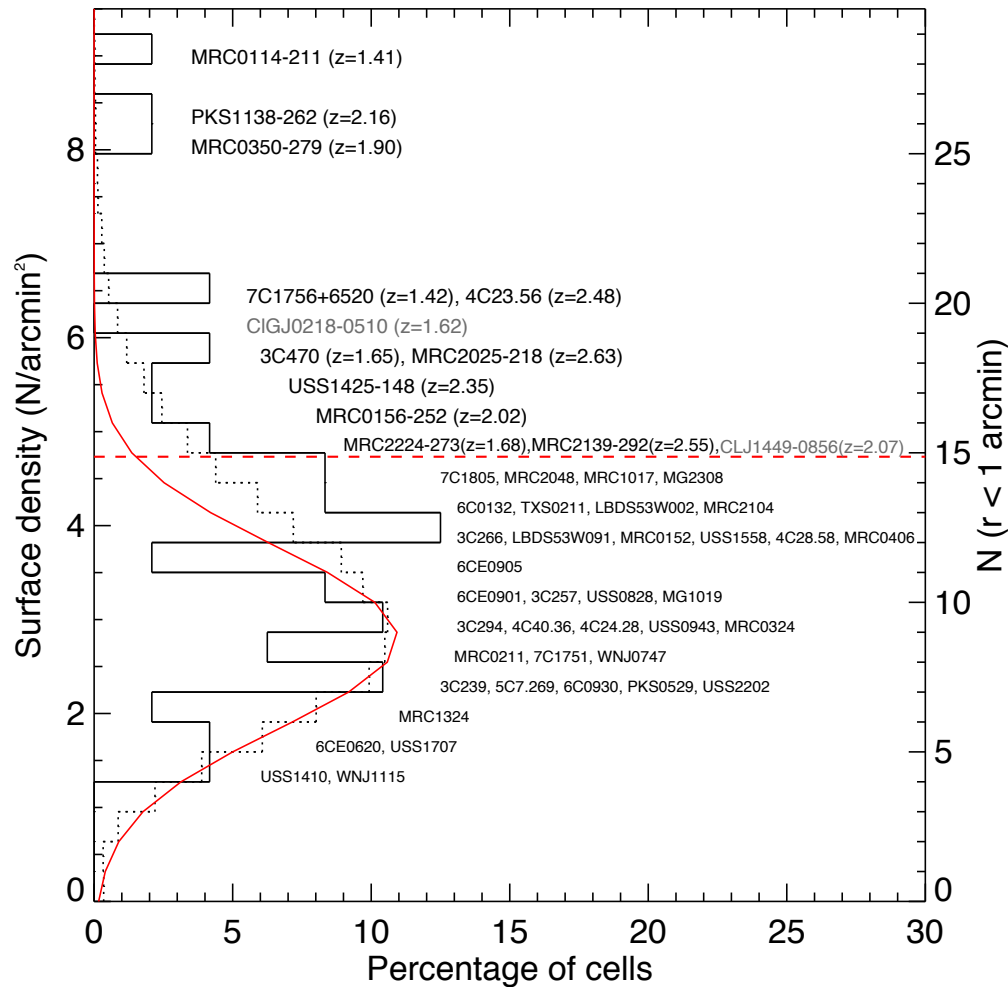


CARLA – FIRST RESULTS

SpUDS: $\sim 1\text{deg}^2$
PI: Dunlop



CARLA – FIRST RESULTS

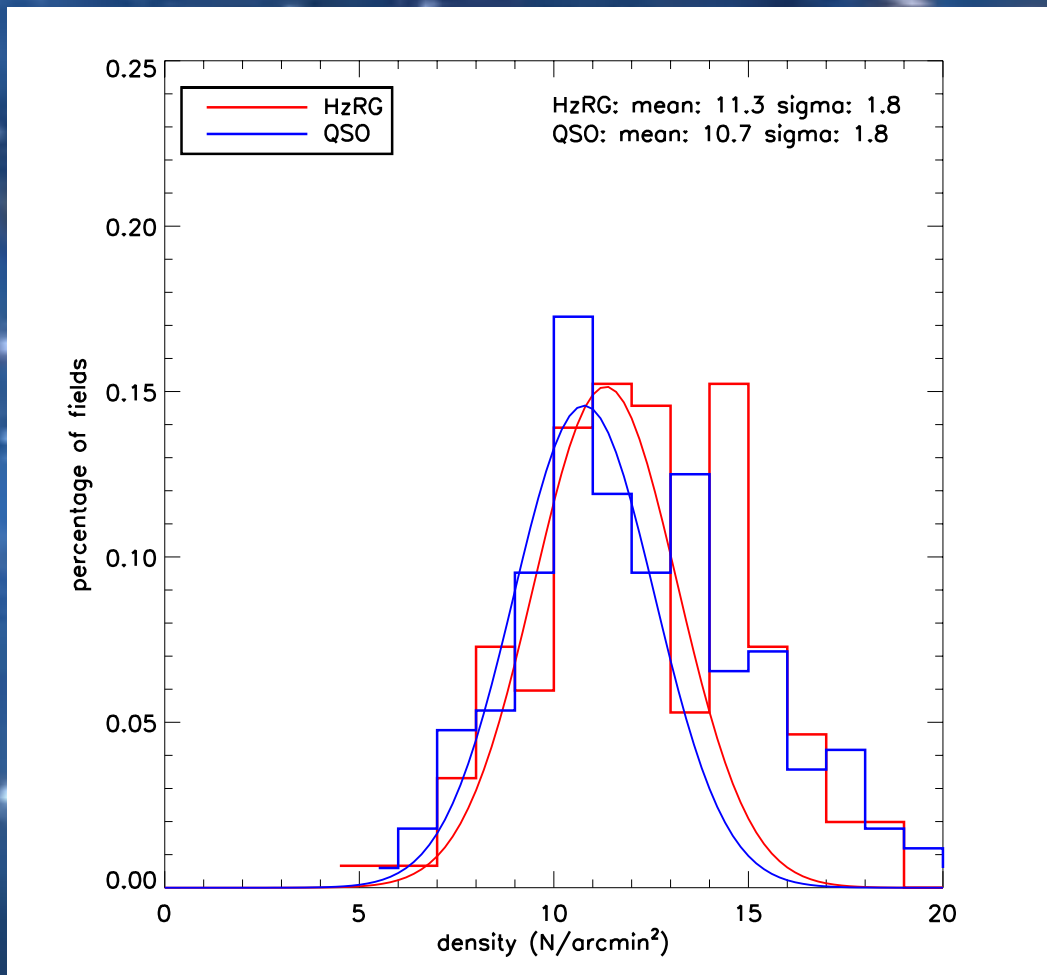


Galamez et al., 2012

Talk by J. Vernet



CARLA – FIRST RESULTS



No difference in field density for radio galaxies and radio quasars



Orientation driven AGN unification?



CARLA – SUMMARY

CARLA results support orientation driven unification model

CARLA fields are clearly denser than blank fields
→ protocluster candidates

Measurement of m^* for galaxy clusters at $z > 1.3$ possible



CARLA – OUTLOOK

Quantify clustering signal around radio loud AGN

Quantify filamentary structure

Spectroscopic follow up of densest fields



THANK YOU

