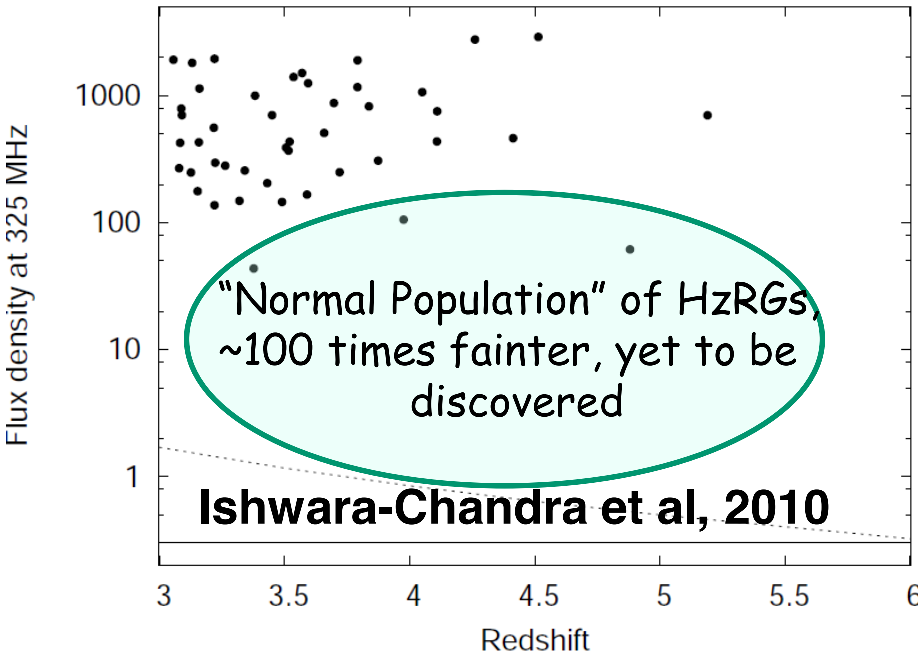
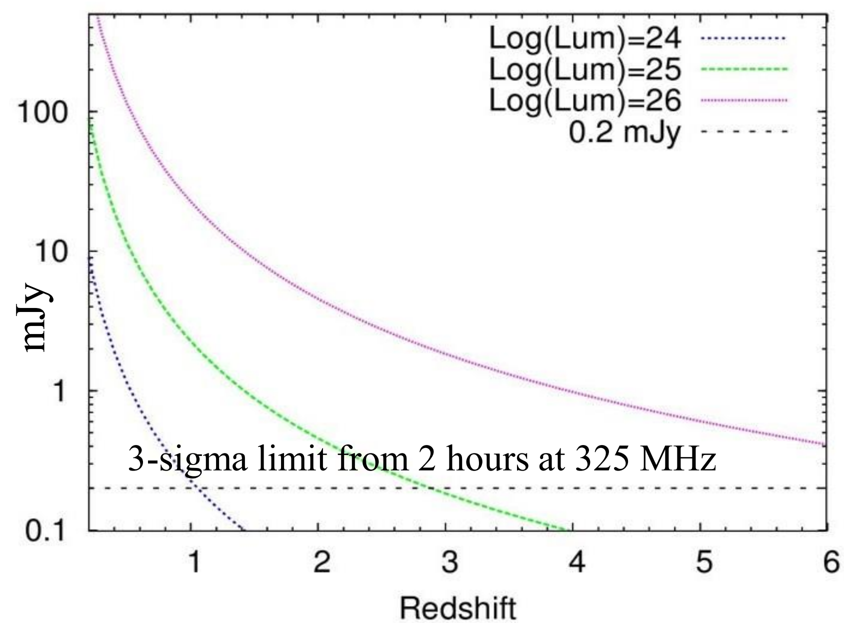
Deep Observations of Legacy Fields at 325 MHz with GMRT

Ishwara-Chandra CH, NCRA-TIFR, India

Our GMRT programme to search for HzRGs, taking advantage of -
Radio spectral-index – redshift correlation is the most efficient method to find HzRGs.
Samples selected at low frequencies have higher fraction of HzRGs against that at 1.4 GHz
To study sub-mJy sources at low radio frequencies.
To optmize the search, '**well known deep fields**' are chosen for observing.

.**LBDS** – *Ishwara-Chandra et al, 2010, MNRAS, 405, 436* – (**150 MHz)**
.**DEEP-II-1,2,3**. *THIS WORK*
.**VIRMOS-VLT** ; **VLA-COSMOS** ; **HDF/GOODS-N** – **XMM-LSS – Lockman Hole – archival data (eg: CDFS).**





(Left:) Known HzRGs represent tip of the iceberg; ∼3 orders of magnitude brighter than FRI/FRII break (right: GMRT can detect low power radio sources out to z=2 at 325 MHz)

One of the DEEP2 field at 325 MHz with GMRT

Rms noise of 70 microJy/beam; resolution ~ 7”

Deep observations at 325 MHz with GMRT for several legacy fields – prelimilary results from one of the DEEP2 fields (1652+3455).

About 120 sources have α > 1 and majority remain un-identified with SDSS

This will also be used to study faint radio sources, along with available deep multi-band data.

With wide band (250-500 MHz) upgraded GMRT soon, we aim to get down to 10 microJy for some of these fields, ~ 6” beam

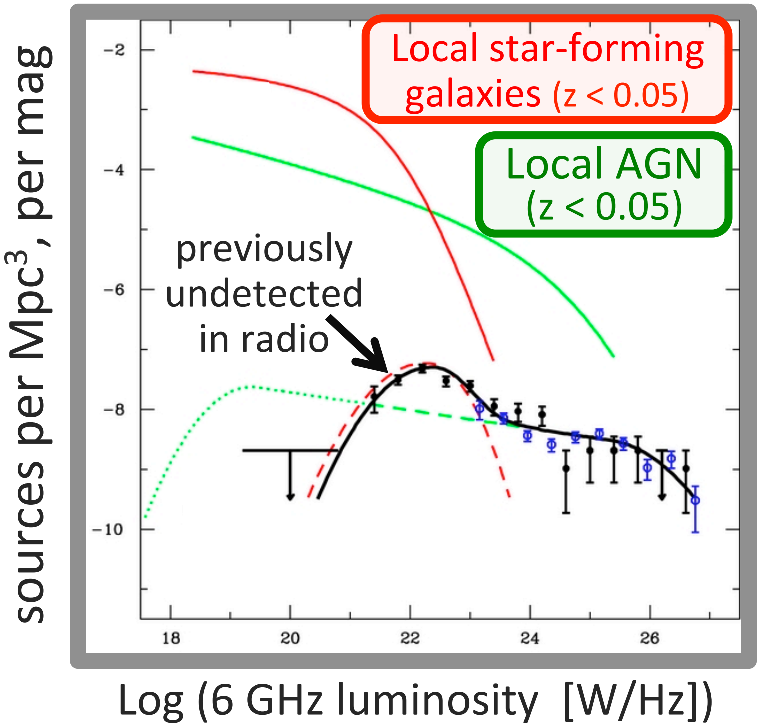
Upgraded GMRT is now SKA-pathfinder some of early SKA science will be attempted.

Radio emission from radio-quiet QSOs

Kimball (Condon, Kellermann, Ivezić, Perley)

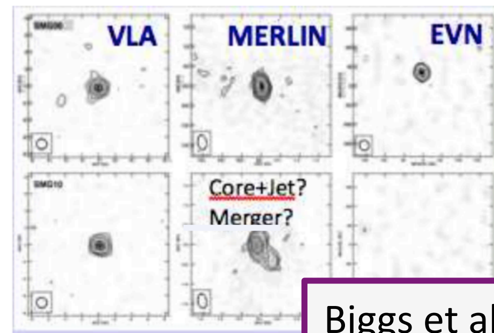
Measuring the QSO radio luminosity function (RLF)

QSOs 0.2 < z < 0.3

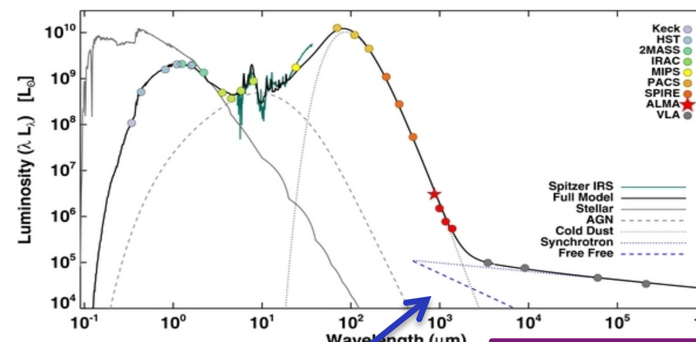


Kimball, Kellermann, Condon et al. 2011

How to determine true physical origin?



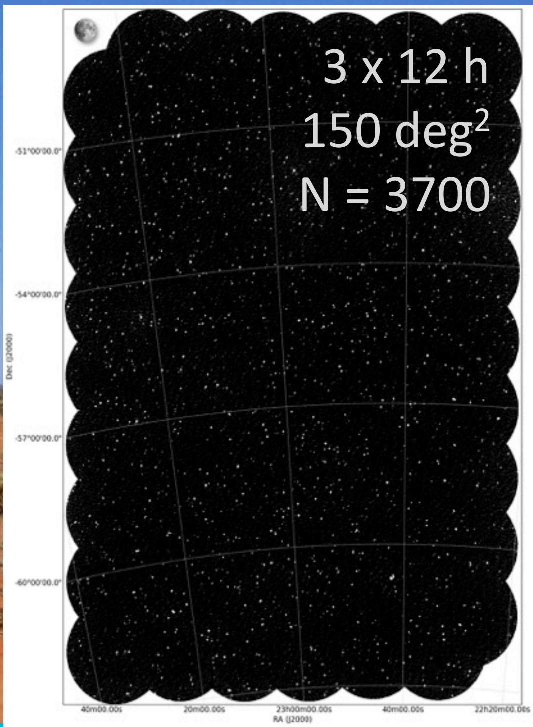
Biggs et al. 2010



Free-free emission: best measure of SFR?

Alatalo et al. 2015

Commissioning and Early Science results from the Australia SKA Pathfinder (ASKAP)



Heywood et al. submitted

Amy Kimball for the ASKAP Commissioning and Early Science team; ASKAP Engineering team

Register now: www.csiro.au/ASKAP2016

CSIRO

ICRAR International Centre for Radio Astronomy Research

CAASTRO ARC CENTRE OF EXCELLENCE FOR ALL-SKY ASTROPHYSICS

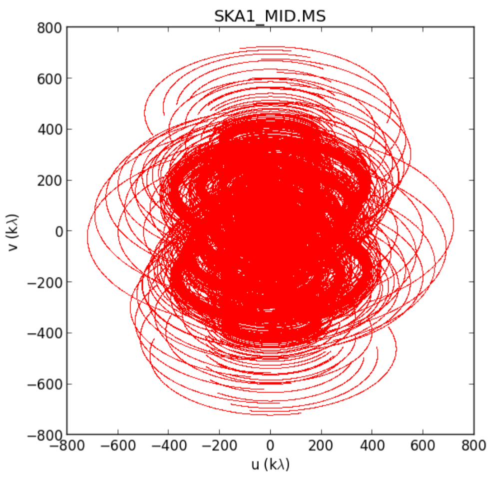
Astronomy Australia Ltd.

RadioLensfit: Bayesian Weak Lensing Measurement in the Visibility Domain

Marzia Rivi (UCL), Lance Miller (University of Oxford),
Sphesihle Makhathini (SKA South Africa), Filipe Abdalla (UCL)

Adaptation to radio data of *lensfit*, a model fitting approach used for optical WL surveys:

- Galaxy shape measurement in the visibility domain
- Analytical Sersic galaxy model
- Individual galaxies at the phase centre
- Bayesian likelihood marginalisation



SKA1 simulations:

- Galaxy distributions estimated from the VLA 20cm continuum radio survey in the SWIRE field.
- SKA1-MID baseline configuration, the first 30% of Band 2.

Shear bias for RadioLensfit method

Simulation of 10^4 galaxies to estimate with an accuracy of 1% an input shear ellipticity of amplitude $g = 0.04$ for several orientations.

	Multiplicative bias	Additive bias
SKA1 requirements	0.0067	0.00082
CFHTLenS	~0.06	~0
RadioLensfit simulations (for each ellipticity component)	$m_1 = 0.0157 \pm 0.0057$ $m_2 = 0.0108 \pm 0.0056$	$c_1 = 0.00047 \pm 0.00015$ $c_2 = 0.00031 \pm 0.00015$

- **Multiplicative biases comparable to the requirements** on a 5000 deg^2 SKA1 survey, and the **additive bias 50% smaller**.
- **Multiplicative bias on average 5 times smaller than** the calibration correction for the **CFHTLenS** ground-based optical survey.

Wide - Band Off-axis Polarization Effects

Preshanth Jagannathan

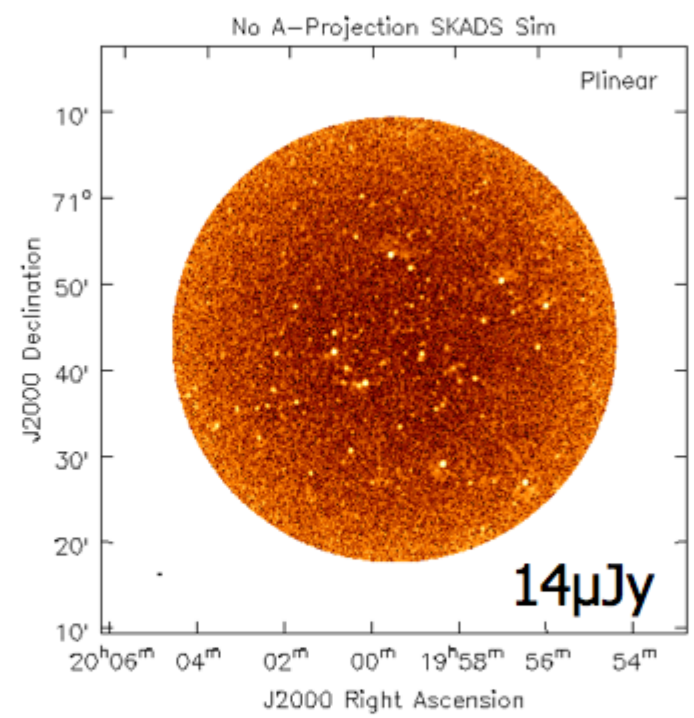
University of Cape Town / NRAO

Co-authors: Sanjay Bhatnagar, Urvashi Rau, Russ Taylor

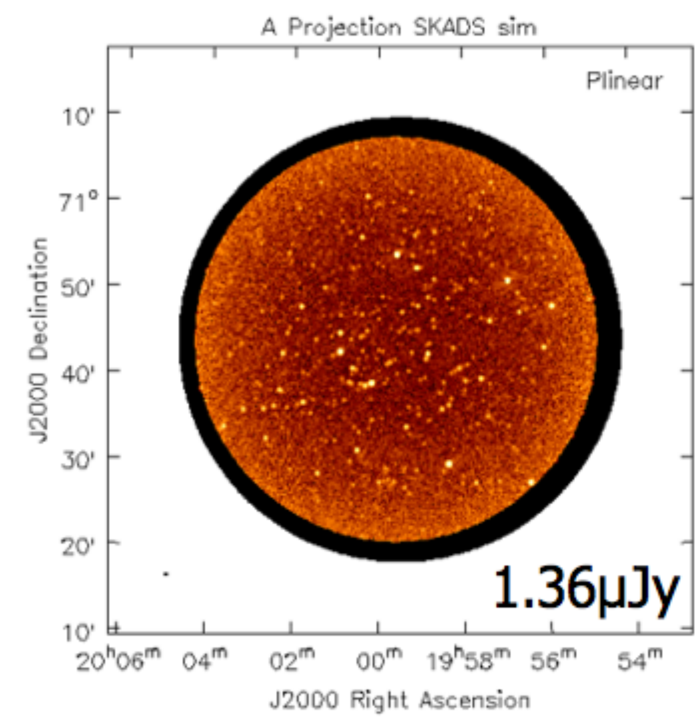
Atacama Large Millimeter/submillimeter Array
Expanded Very Large Array
Robert C. Byrd Green Bank Telescope
Very Long Baseline Array

NRAO

VLA D Configuration, L Band Deep Field Simulation
1000 SKADS Sources in the field (866 in beam) in IQUV. The images to the right are images of Linear Polarized Intensity. Made from the simulated measurement set.

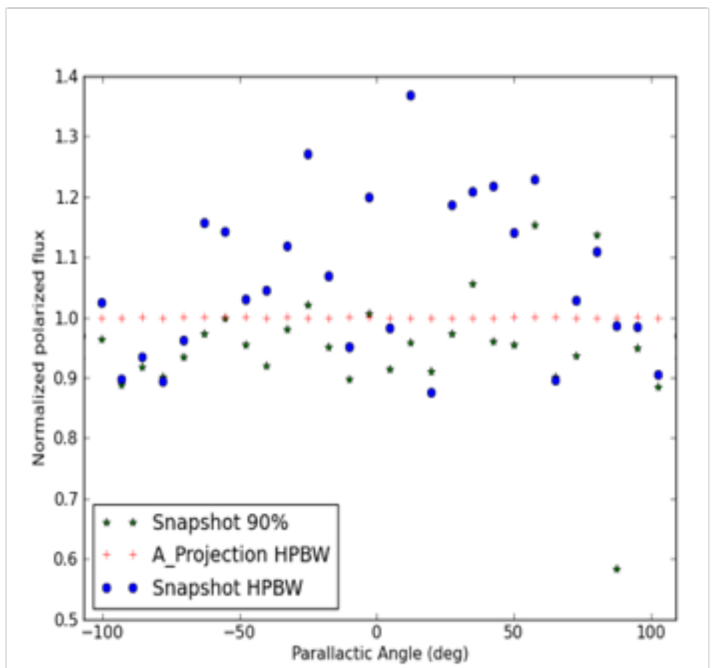


Standard Imaging

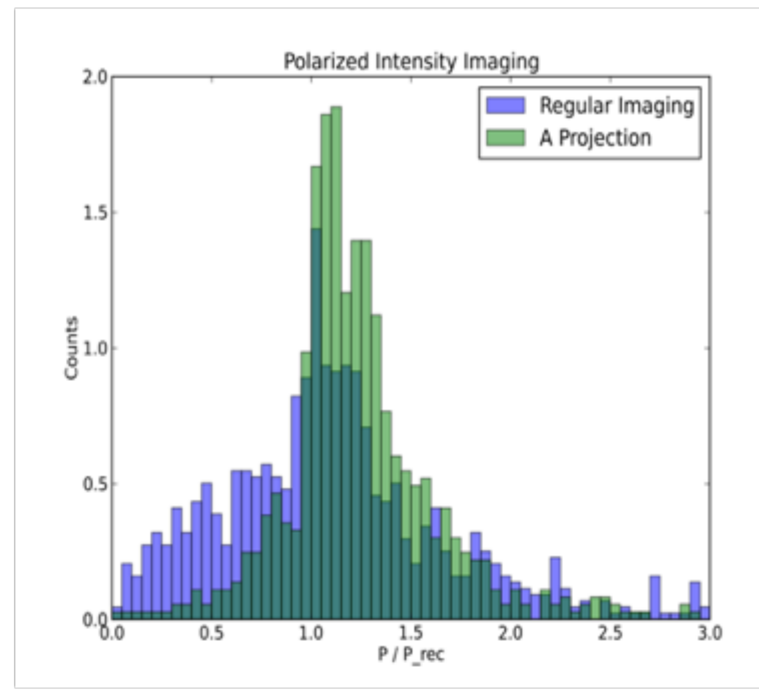


AW-Projection

Ratio of input linear polarized flux of the simulated sources to the output linear polarized flux of the imaged sources. This gives us a measure of imaging fidelity.



Sources at different parallactic angle with and without A-Projection



Binned counts with and without A-Projection

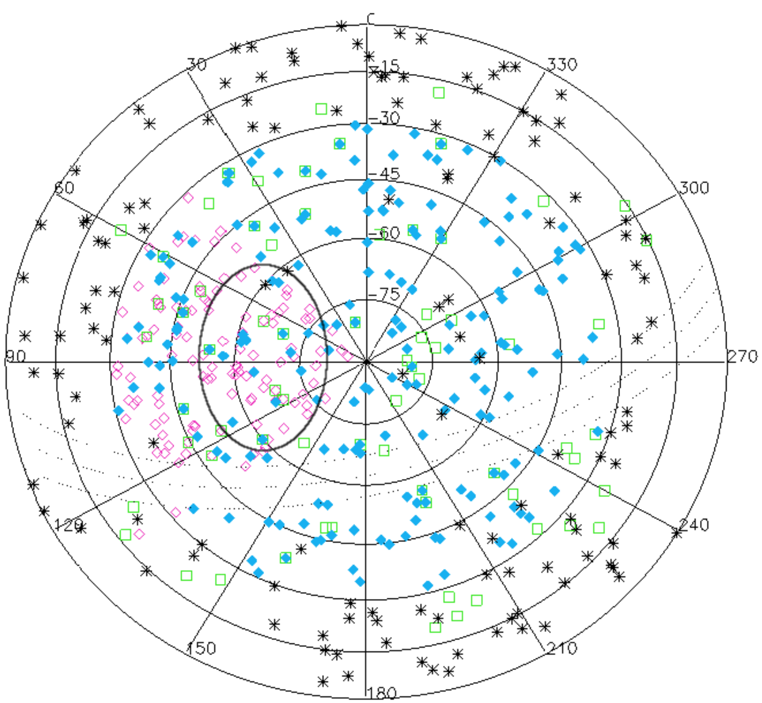
Polarimetric multi-frequency observations of a complete sample of radio sources

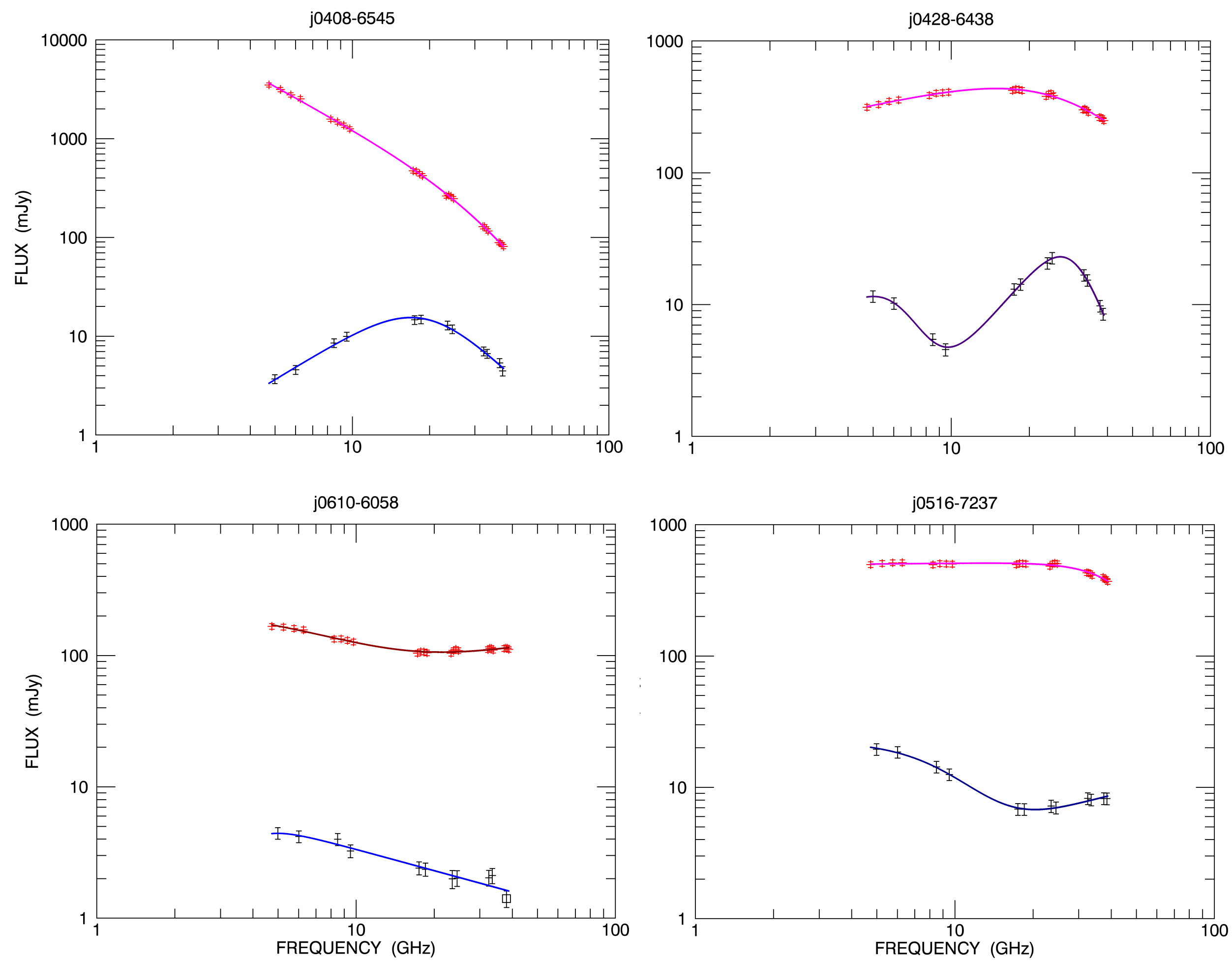
- Premiale iALMA -

V. Galluzzi[1,2], M. Massardi[2] and L. Gregorini[1,2]
[1]Dipartimento di Fisica e Astronomia, Università di Bologna
[2]INAF, Osservatorio di Radioastronomia

New observations (Sep 2014) with ATCA dedicated to a polarimetric study on a complete sample of 53 sources of the faint (S > 200 mJy) PACO sample, covering the Southern Ecliptic Pole region (ecliptic latitude < −75°).

- Characterize the polarization properties of radio source populations in the 5 − 40 GHz frequency range.
- Estimate the radio source contamination to the CMB polarization power spectrum up to 40 GHz.
- Statistically study the physics of synchrotron emission processes.
- Measure total intensity and polarization variability over few years (comparing with previous PACO and AT20G runs).





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ALMA Cycle 3 Proposal: approved with high ranking (PI: V. Galluzzi)
Measure polarization of 31 faint PACO sources at 100 GHz.

ATCA Proposal: observations scheduled at the end of March 2016 (PI: M. Massardi)
Measure polarization of 106 faint PACO sources in the 2 – 40 GHz frequency range.

NIKA 2: a continuum/polarized camera at IRAM 30 m telescope

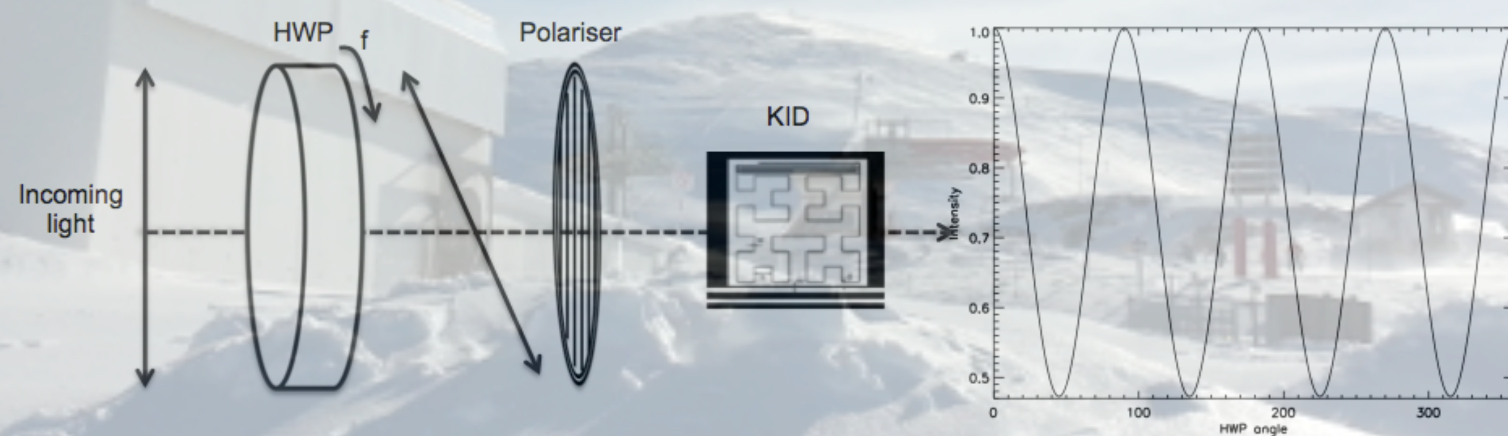
Scientific objectives:

1. Clusters of galaxies via the Sunyaev Zel'dovitch effect
2. Deep surveys
3. Mapping the interstellar medium
4. Nearby Galaxies
5. Polarization measurements of Galactic regions

NIKA2 camera:

- High resolution dual-band camera observing the sky in intensity and polarization at **150 GHz** and **260 GHz**.
- High mapping speed, **6.5 arc-minutes of FOV** and 5000 LEKIDs

Polarization setup

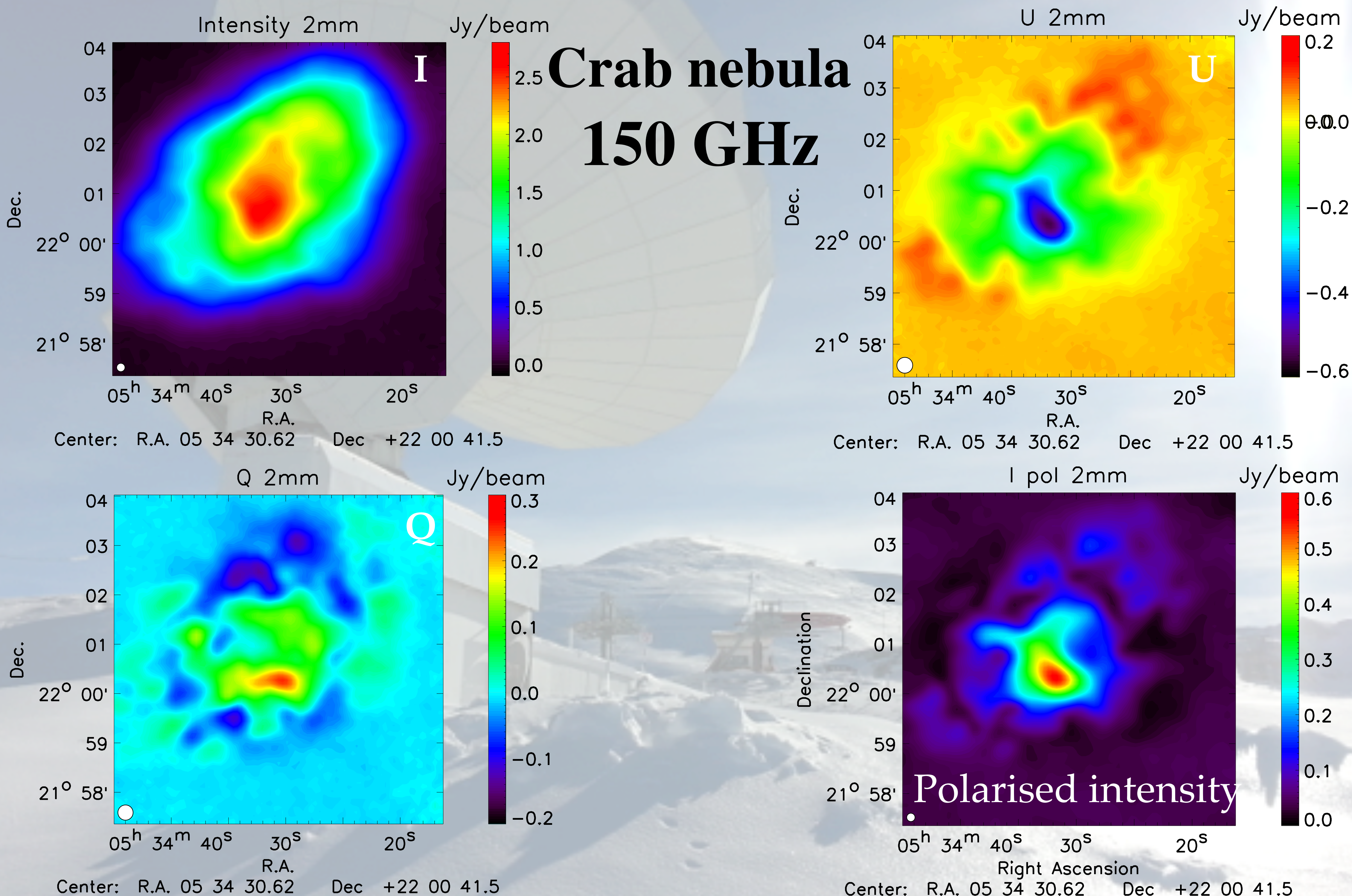


- Rotating achromatic half wave plate at about 3 Hz
- A polarizer to select the incident polarization direction as Hilbert KIDs are not sensitive to polarization
- Modulation/Demodulation procedure to extract the polarized signal at 4 times the HWP mechanical rotation frequency

Simultaneously measurements of three Stokes parameters (I, Q, U)

Polarization performance of the NIKA prototype

Crab nebula
150 GHz



GOOD AGREEMENT WITH XPOL MEASUREMENTS (Aumont et al. (A&A), 514, A70)