

VLA Image Reduction Results

Recently Dr. Russel attended the Very Large Array (VLA) Imaging course in Socorro, New Mexico

This course taught how to take the data sets from the VLA archive and produce images.

The following is the first set of images reduced from the VLA archive by Dr. Russel.



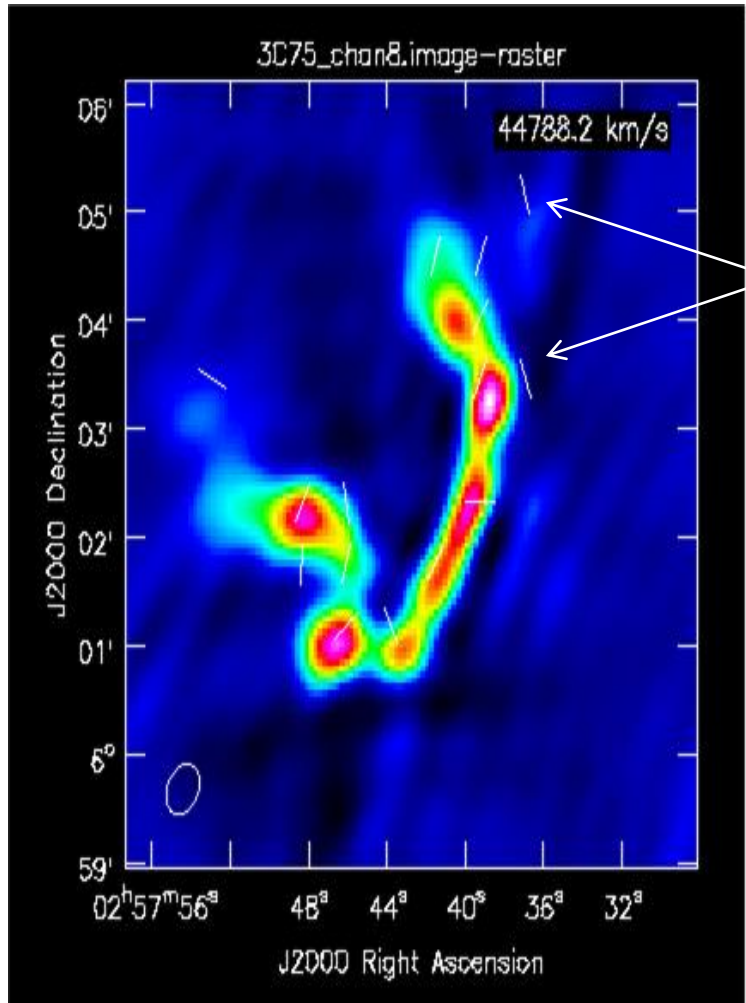
3C75 Binary Black Hole System

VLA OBSERVING LOG

2018-10-04_0541_TDRW0001

Observing Date: 04-Oct-2018	Project: TDRW0001	# Subarrays: 1	Observation Type: Test
Configuration: D	Observer (PI): Dr Emmanuel Momjian	Band(s) Used: C S	
Decommissioned: 27	SBID(s): 35624494		
	Source File(s): TDRW0001_sb35624494_1_1		
	Observer E-mail: emomjian@nrao.edu		
	Operator(s): Kenneth Gibson		

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Polarization vectors

Background Information

Wikipedia

3C75 (a.k.a. 3C 75) is a [binary black hole](#) system in the [Abell 400 cluster of galaxies](#).

It has four radio jets (two from each accreting black hole). It is travelling at 1200 kilometers per second through the cluster plasma, causing the jets to be swept back.

The binary [supermassive black holes](#) are themselves contained in the dumbbell shaped galaxy [NGC 1128](#). 3C 75 may be X-ray source 2A 0252+060 (1H 0253+058, XRS 02522+060). [\[4\]](#)

Wikipedia



Followed tutorial

https://casaguides.nrao.edu/index.php/Polarization_Calibration_based_on_CASA_pipeline_standard_reduction:_The_radio_galaxy_3C75-CASA4.5.2

and produced this image: Dr. Richard A. Russel 10/16/19 (detail in CASA 3C75 Tutorial.odt)

3C391 Supernova Remnant

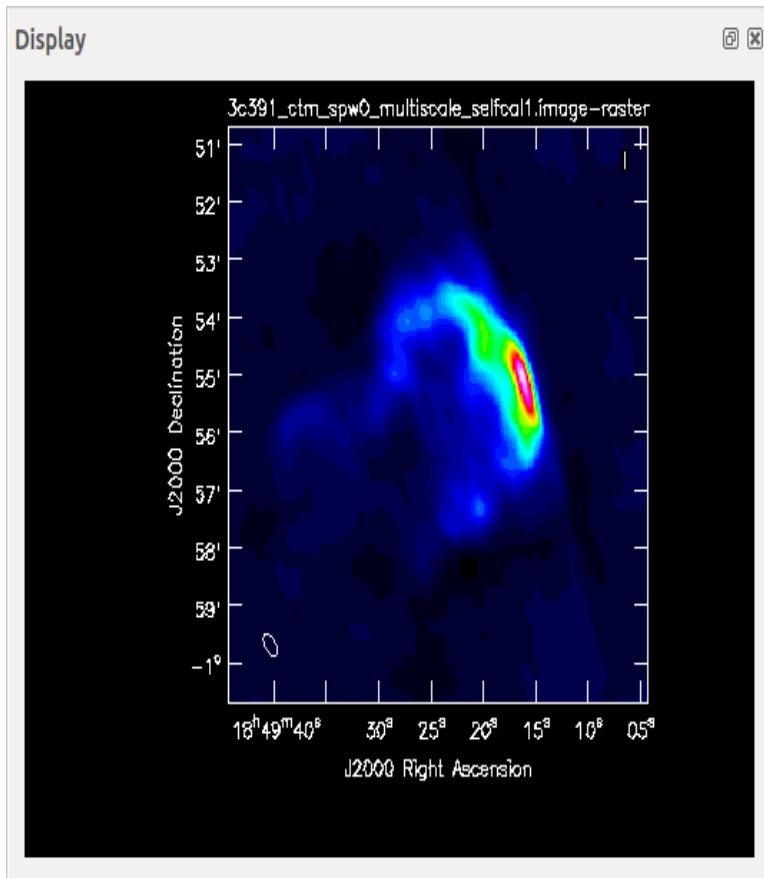
EVLA OBSERVING LOG

2010-04-24_0801_TDEM0001

Observing Date: 24-Apr-2010
 Configuration: D
 Decommissioned: 10
 VLBI Ref Ant:
 VLBI Ant Pad:

Program:	TDEM0001	Observing Mode:	Mixed Modes
Observer(s):	James Miller-Jones	Bands Used:	C
User #:	2398	# Subarrays:	1
Observer's E-mail:	jmiller@nrao.edu, mrupen@aoc.nrao.edu	Initial Source:	J1331+3030
Source File(s):	TDEM0001_sb1218006_1.evla		
Operator(s):	Sam Gilmore		

Data Reduction Results



Background Information Astronomy and Astrophysics 78,75-77 (1979)

Observations of the Supernova Remnant 3C391 at 1.4 and 10.7 GHz

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Received August 17, 1978

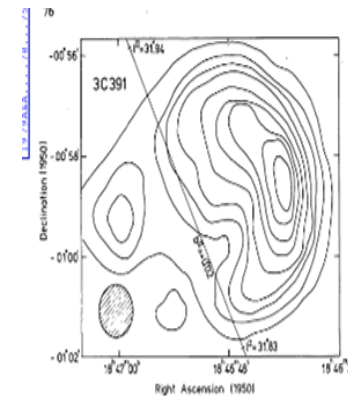


Fig. 1. Map of 3C391 observed with the Fleurs Synthesis Telescope. The HPBW is $54 \times 66''$ arc ($\alpha \times \delta$). The contour levels are 50, 100, 150, 200, 300, ..., 700 K (50 K = 0.27 Jy/beam)

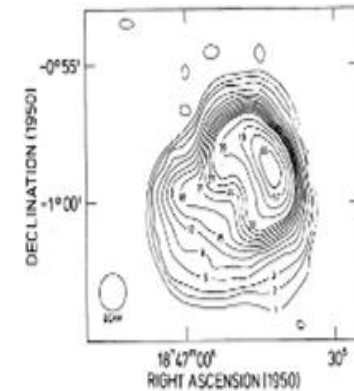


Fig. 2. Map of 3C391 observed at 10.7 GHz with the Effelsberg telescope. The half-power beamwidth is $77''$. The contour unit is 0.02°K in antenna temperature or 0.03°K in brightness temperature

Asymptotic Giant Branch (AGB) Star IRC+10216

Background Information Wikipedia

EVLA OBSERVING LOG

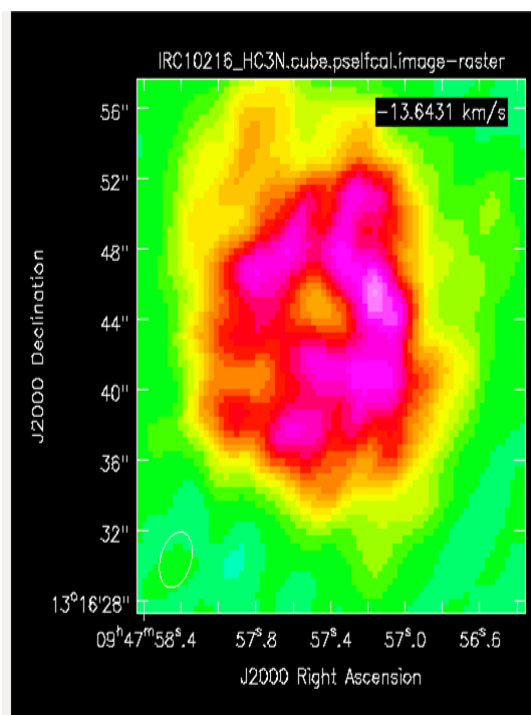
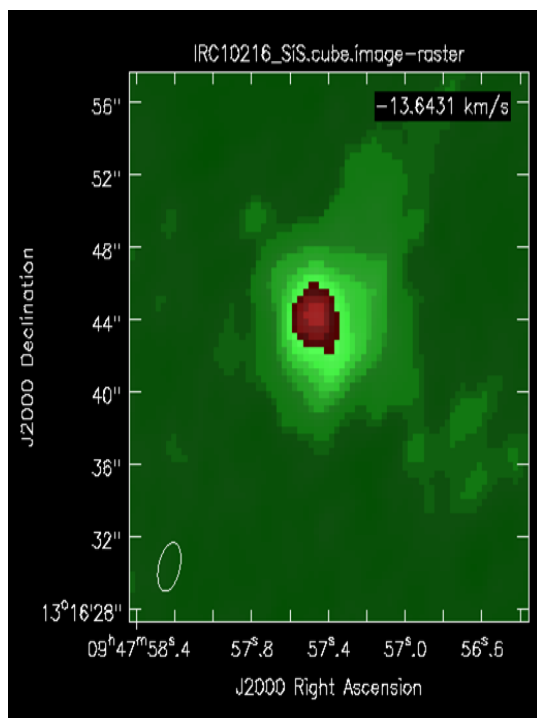
2010-04-26_0310_TDEM0003

Observing Date: 26-Apr-2010
Configuration: D
Decommissioned: 10
VLBA Ref Ant: 10
VLBA Ant Pad:

Program:	TDEM0003	Observing Mode:	Continuum
Observer(s):	Mark Claussen	Bands Used:	C, Ka
User #:	661	# Subarrays:	1
Observer's E-mail:	mclauss@nrao.edu, mrupen@nrao.edu	Initial Source:	J1008+0730
Source File(s):	TDEM0003_sb1345754_1.evla		
Operator(s):	Matt Gardner		

IRC +10216 or CW Leonis is a well-studied [carbon star](#) that is embedded in a thick dust envelope. It was first discovered in 1969 by a group of astronomers led by [Eric Becklin](#), based upon infrared observations made with the 62 inches (1.6 m) [Caltech Infrared Telescope](#) at [Mount Wilson Observatory](#).

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Its energy is emitted mostly at infrared wavelengths. At a wavelength of 5 [μm](#), it was found to have the highest flux of any object outside the [Solar System](#).^[12]



MG0414+0534 Gravitational Lens HI Absorption Line

VLA OBSERVING LOG

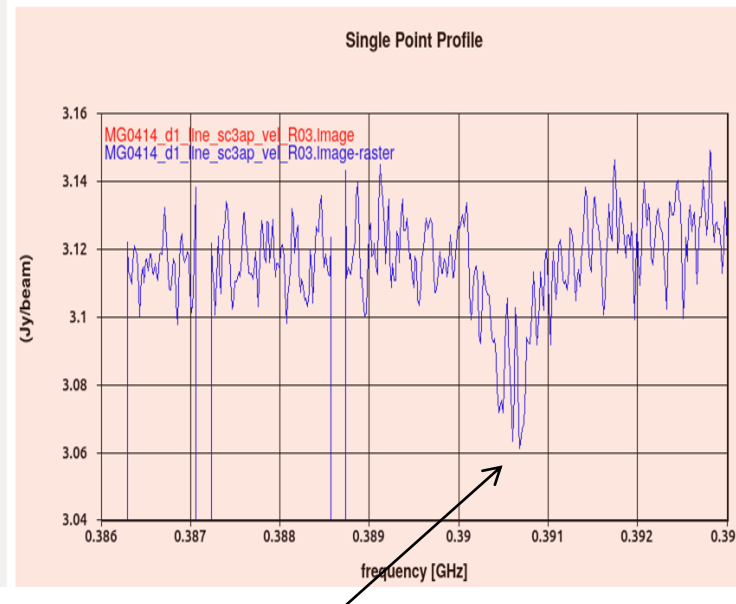
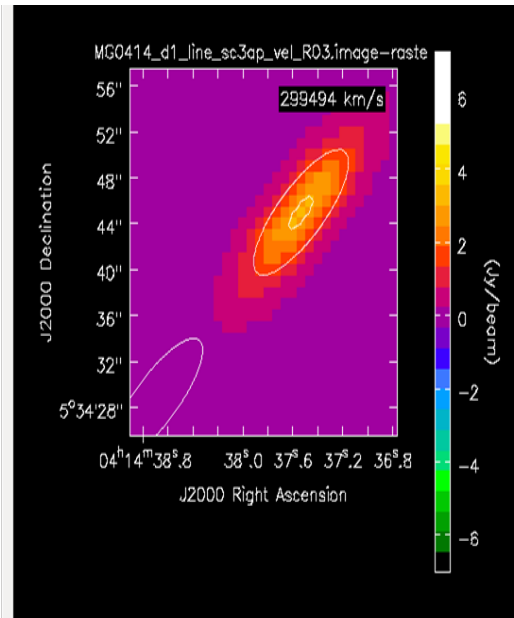
2016-09-14_0620_TSUB0001

Observing Date: 14-Sep-2016
Configuration: B>A
Decommissioned: 11

Project:	TSUB0001	# Subarrays:	1	Observation Type:	Test
Observer(PI):	Frazer Owen	Band(s) Used:	X P		
SB ID(s):	32720781				
Source File(s):	TSUB0001_sb32720781_1				
Observer E-mail:	fowen@nrao.edu				
Operator(s):	Blythe Guvenen				

Background Information
NRAO.edu

Data Reduction Results



Hydrogen Absorption Feature

Goal was to reduce the spectral-line data in the low-frequency P-band of the VLA (230–470 MHz).

The goal is to make an image cube containing HI 21cm absorption against the strong radio continuum of gravitationally lensed radio galaxy MG0414+0534.

As a result of the high redshift of $z=2.6365$, the HI absorption signal in MG0414+0534 is redshifted to an observed frequency of 390.597 MHz.

The HI absorption in MG0414+0534 was previously imaged with the VLA by Moore, Carilli & Menten 1999 (ApJ, 510, 87), (at end of this file) before the upgrade to the WIDAR system.

VLA tutorial reduced by Dr. Richard Russel 10/18/19 – full script of reduction in <file://VLA Image MG0414+0534.odt> [https://casaguides.nrao.edu/index.php/MG0414%2B0534_P-band_Spectral_Line_Tutorial - CASA 5.5.0](https://casaguides.nrao.edu/index.php/MG0414%2B0534_P-band_Spectral_Line_Tutorial_-_CASA_5.5.0)