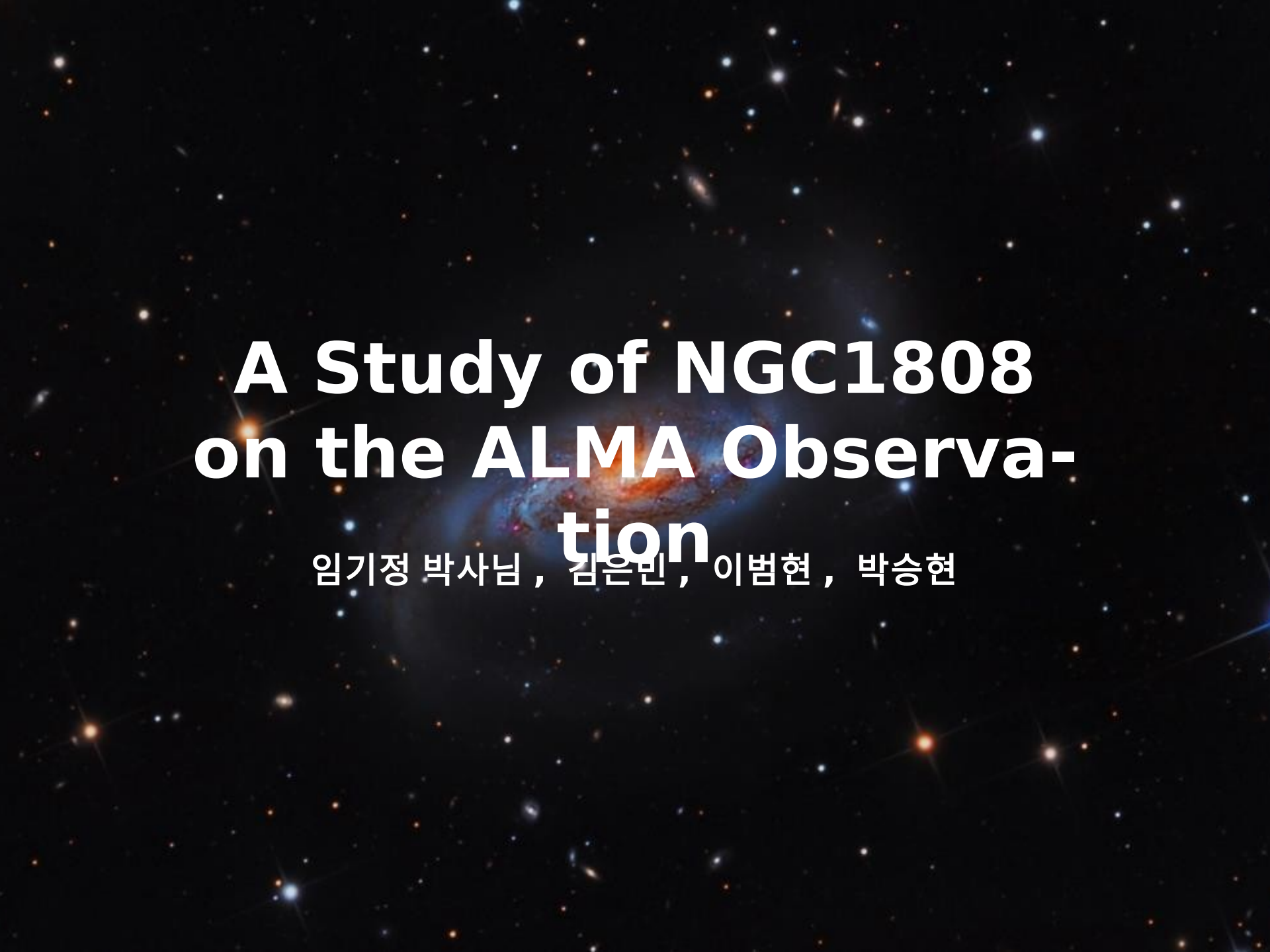




A Study of NGC1808 on the ALMA Observa- tion

임기정 박사님 , 김은빈 , 이범현 , 박승현

Content

1. Introduction

2. Object

3. Observations

4. Imaging

5. Discussion



1. Introduction

➤ Motivation

- ✓ The inflow and outflow process in barred starburst galaxy is a intriguing topic to elucidate star formation and dynamical evolution of the galaxy.
- ✓ There are only few observational studies with high-resolution, but ALMA can do it!

➤ Science Goal

- ✓ Studying molecular gas distribution and kinematics of NGC1808 using 12CO (1-0) data obtained from ALMA observation in NGC1808

2. Object

➤ Basic Parameters of NGC1808

RA (J2000.0) 05h 07m 42.343s
DEC (J2000.0) -37° 30' 45.95''
Distance 10.8 Mpc
Systemic Velocity (LSR) 963.9 ± 2.5 km/s

Position Angle 324°
Inclination 57°
Morphological Type (R)SAB(s)a
Activity HII, Seyfert 2

3. Observations

➤ ALMA 12m Array

Number of Antennas 27

Observation Date 2014 Mar 8

Map Size 150''×150'' (7.8×7.8 kpc²)

cf) Using Map Size 250''×250''

Mosaic 39 fields

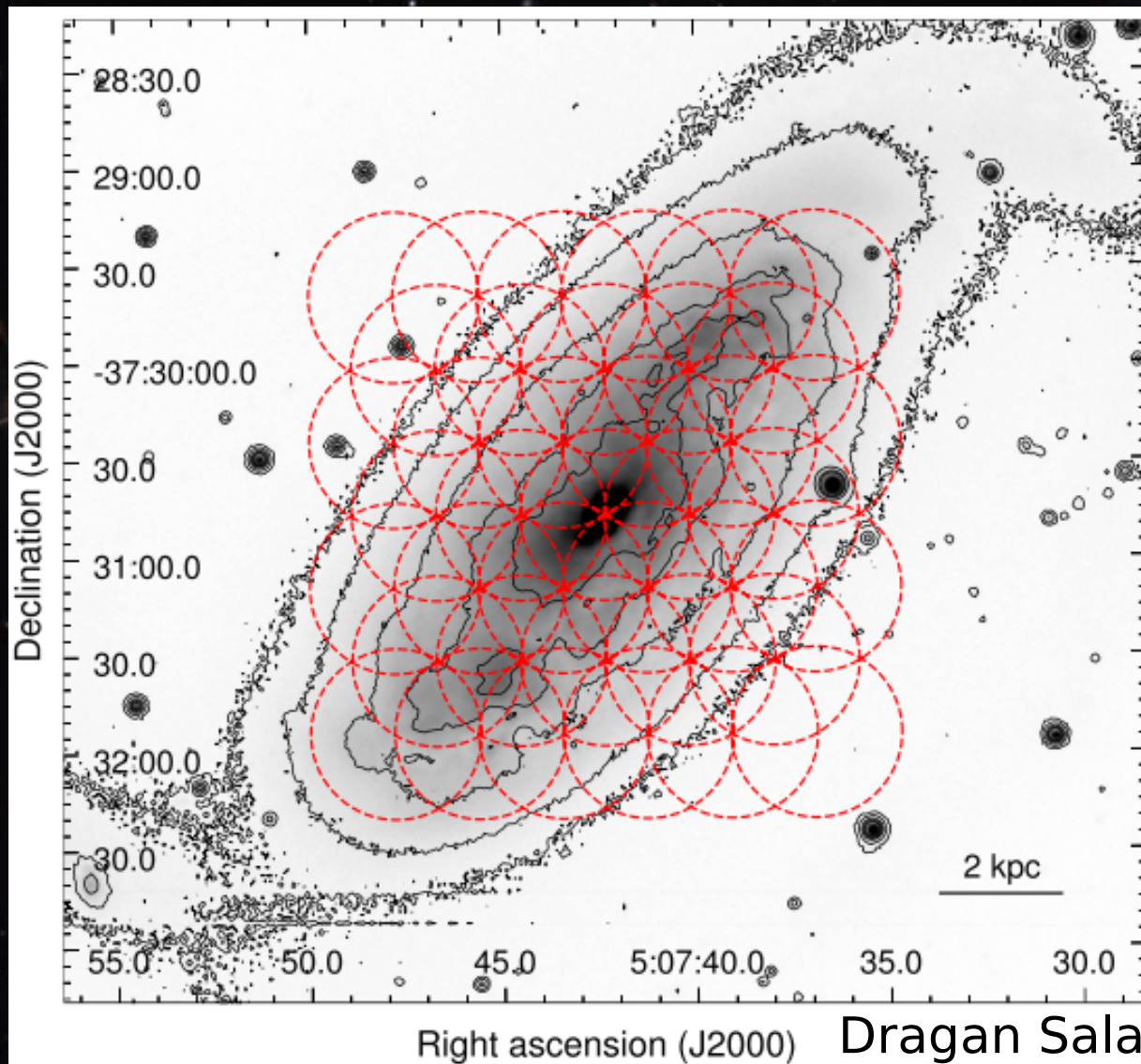
Primary Beam FWHM 52'' ($\lambda = 2.7$ mm)

Total Time on Source 41 minutes

High Resolution 10.0 mJy/beam

cf) Using High Resolution 7.0 mJy/beam

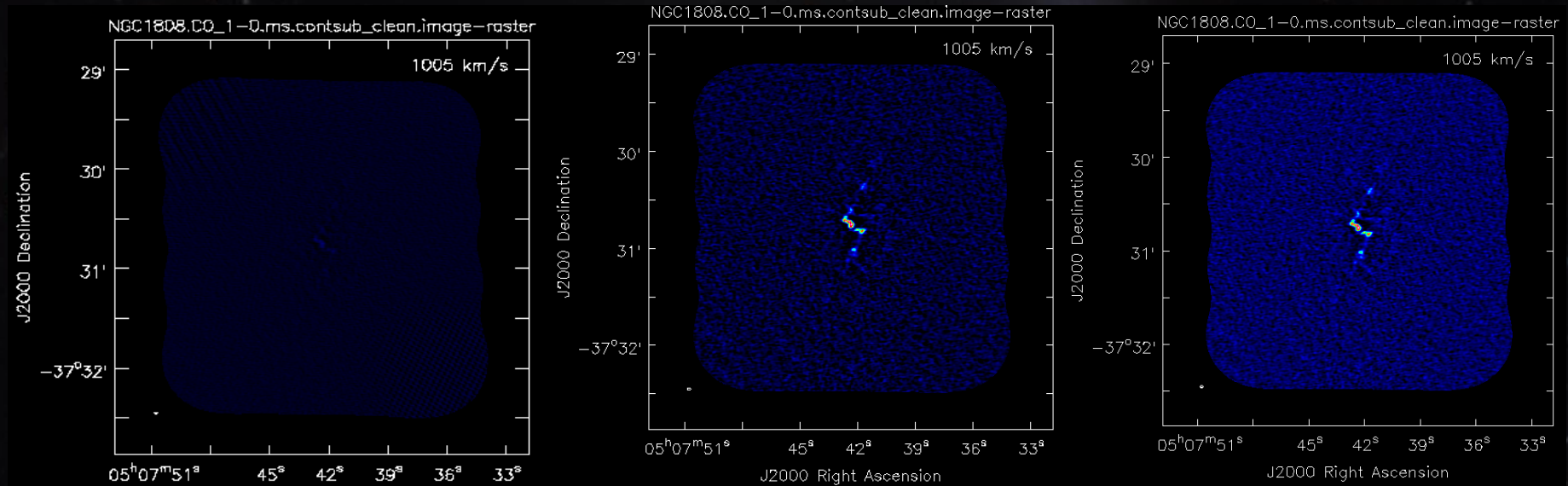
3. Observations



Dragan Salak et al.,
2016

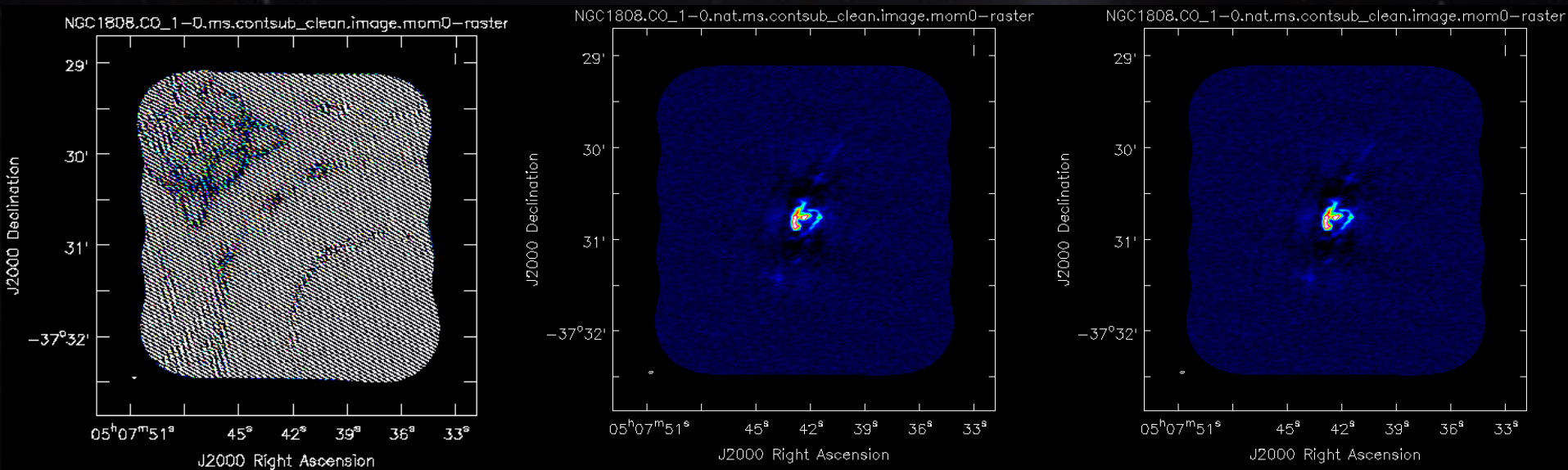
4. Imaging

➤ Channel Map (Uniform / Natural / Robust)



4. Imaging

➤ Intensity Map (Uniform / Natural / Robust)



?!?!!

2.01'' $\times$ 1.37''

768 Jy km/s

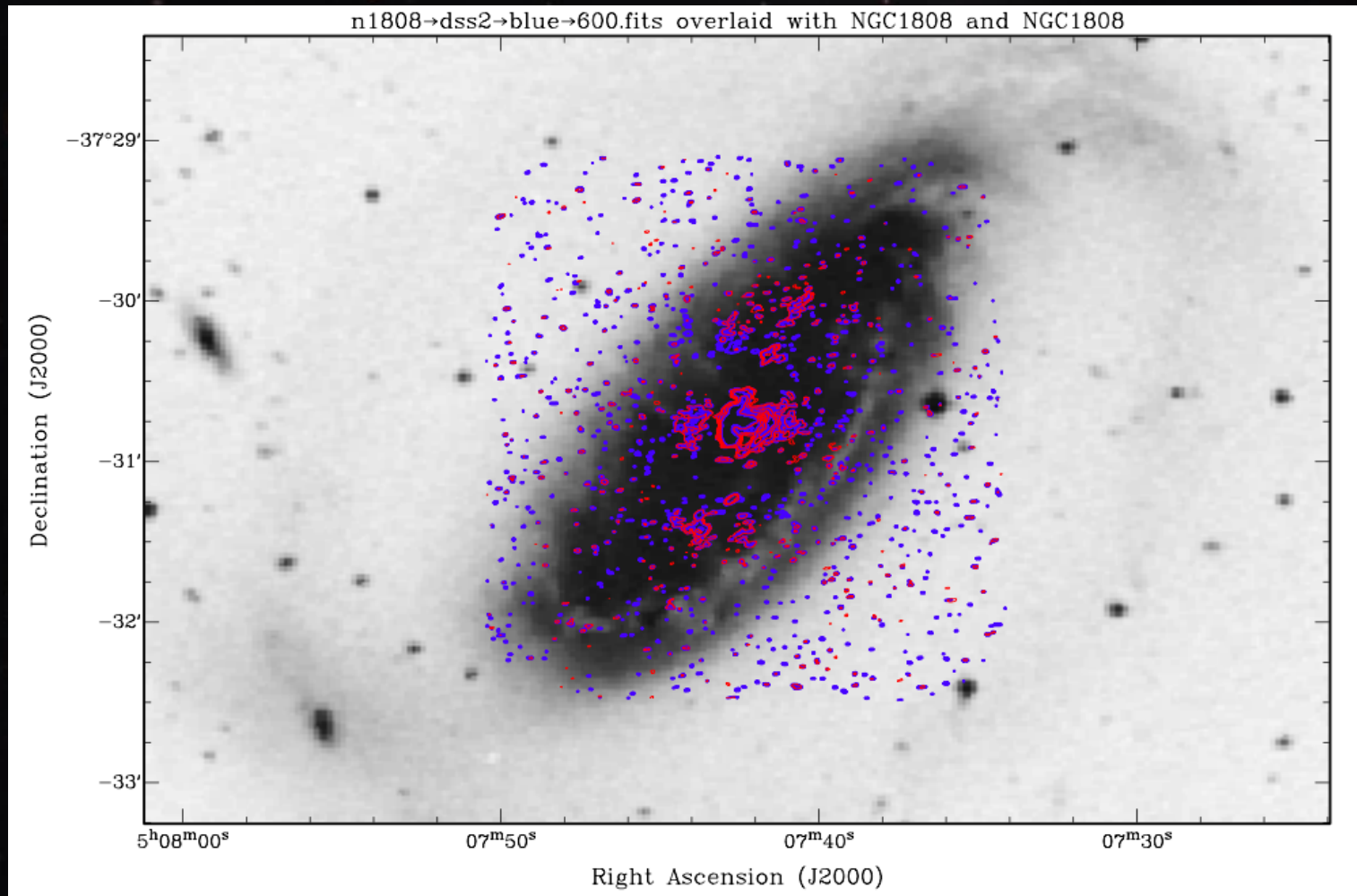
2.50'' $\times$ 1.40''

633 Jy km/s

2.25'' $\times$ 1.19''

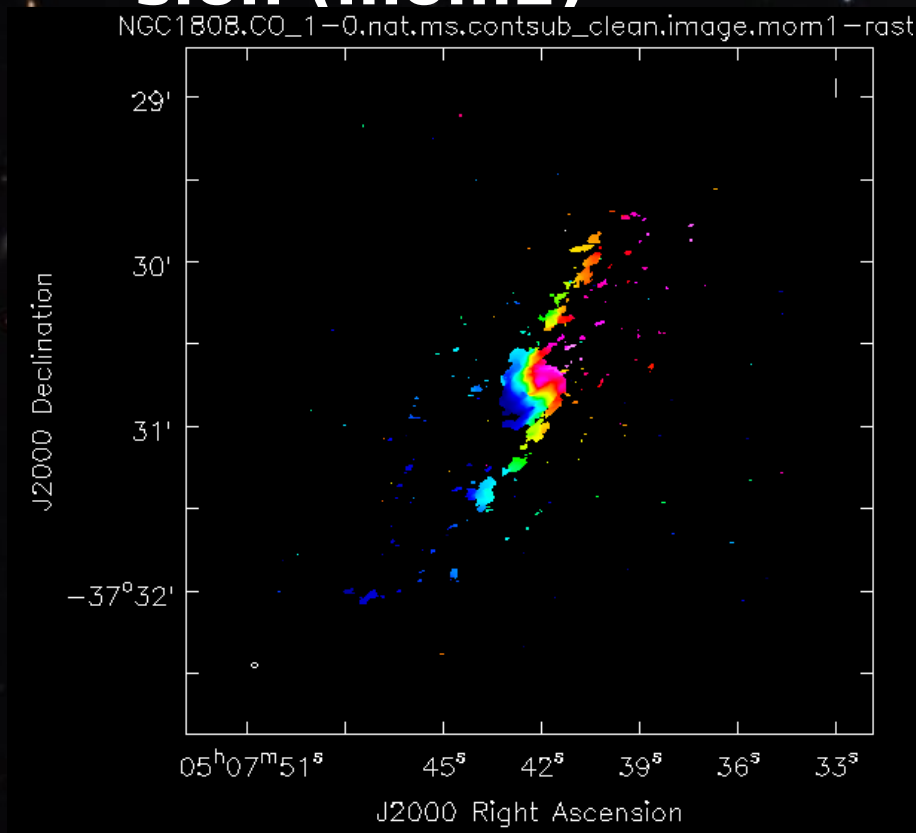
4. Imaging

➤ Intensity Map (**Natural** + **Robust**)

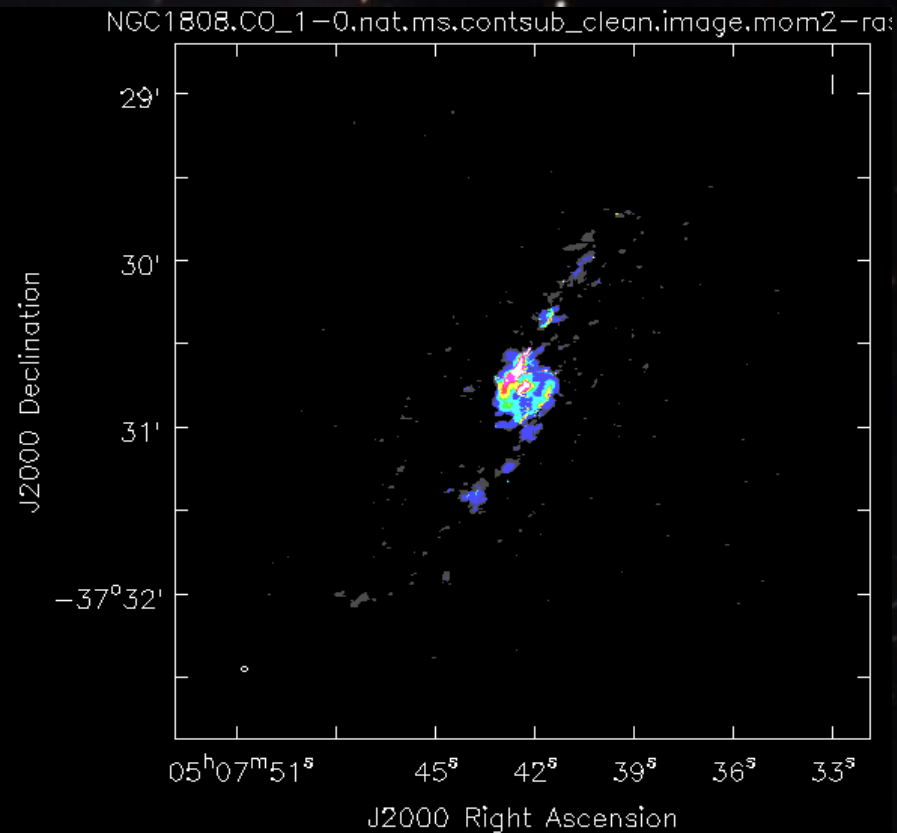


4. Imaging

➤ Velocity Field (mom1) and Velocity Dispersion (mom2)



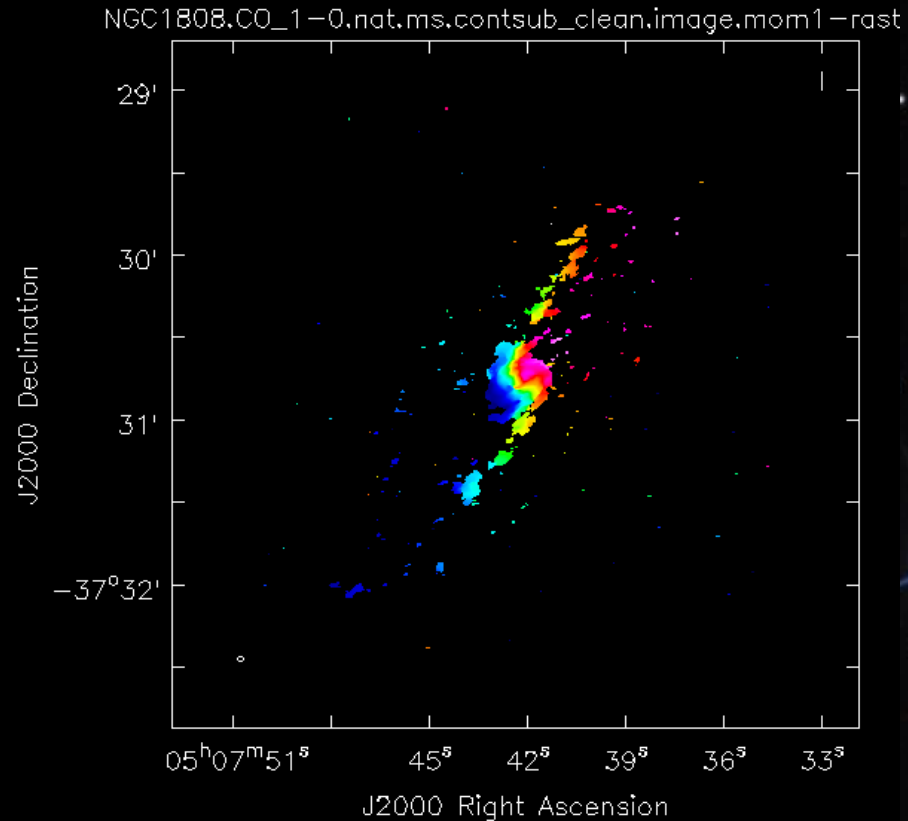
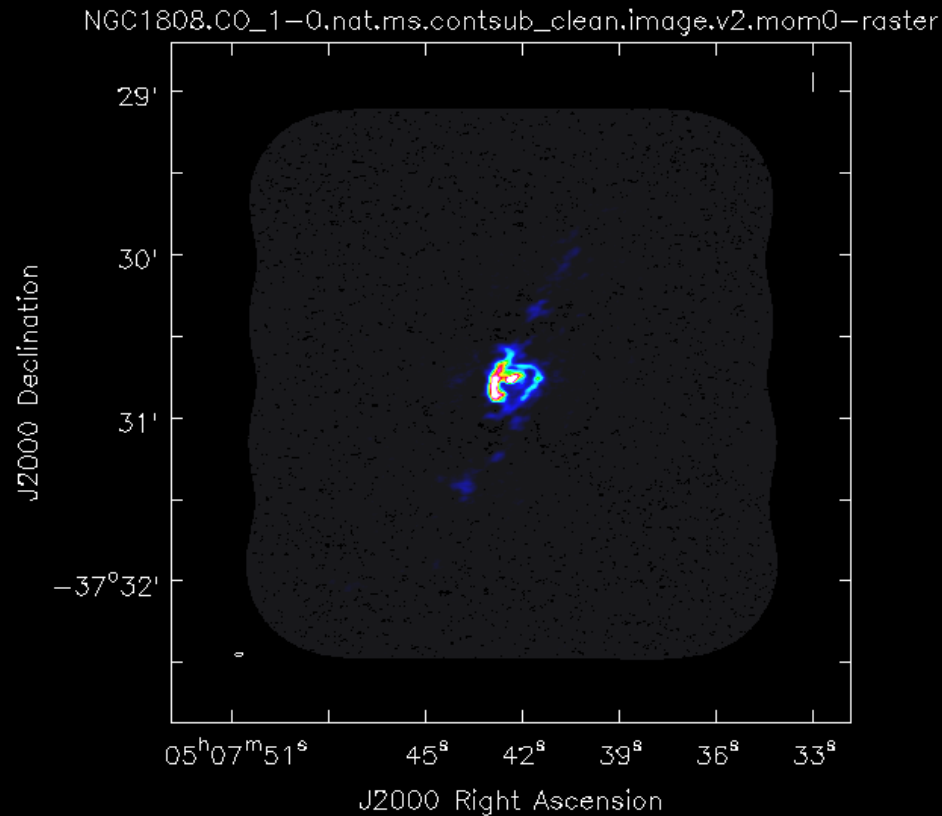
725 km/s ~ 1187
km/s



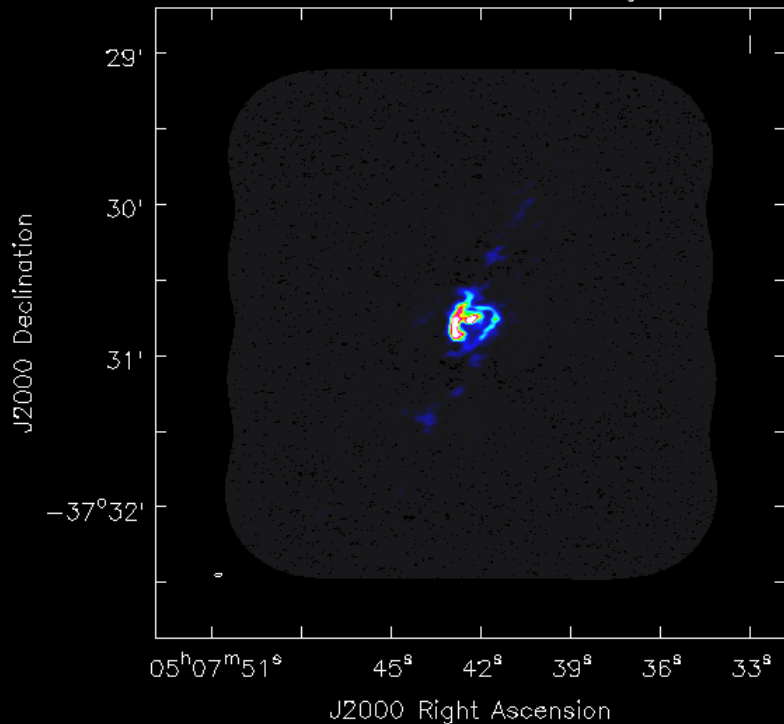
0 km/s ~ 50 km/s

4. Imaging

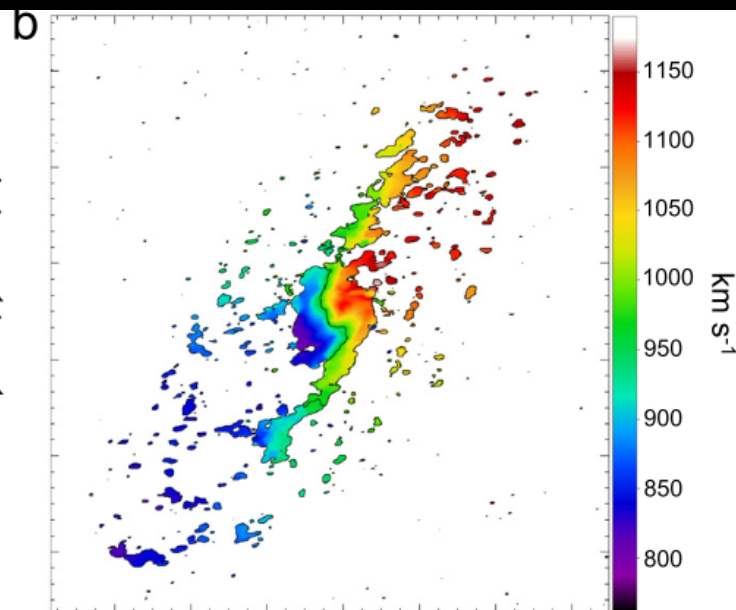
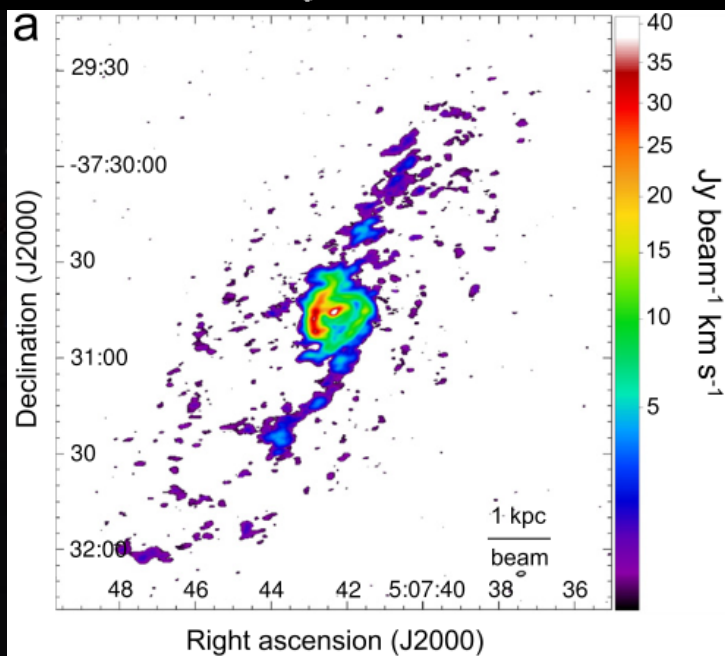
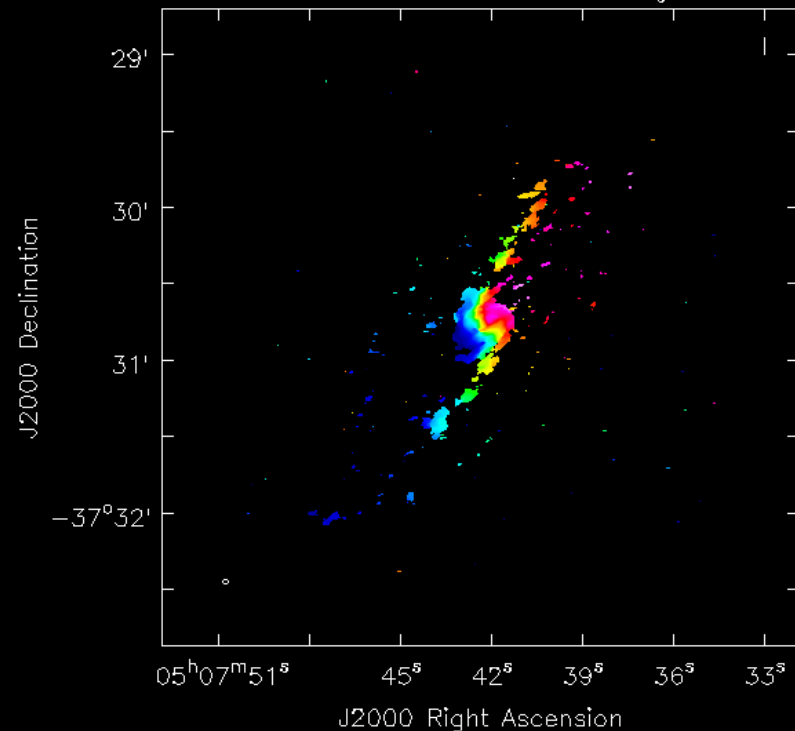
➤ Intensity Map and Velocity Field



NGC1808.CO_1-0.nat.ms.contsub_clean.image.v2.mom0-raster



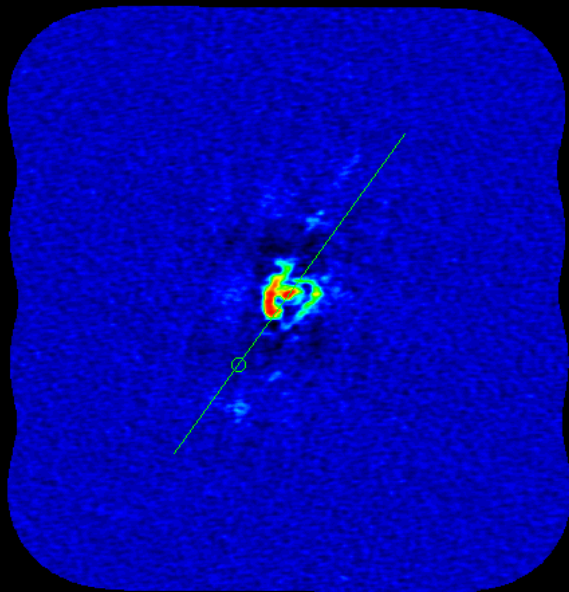
NGC1808.CO_1-0.nat.ms.contsub_clean.image.mom1-rast



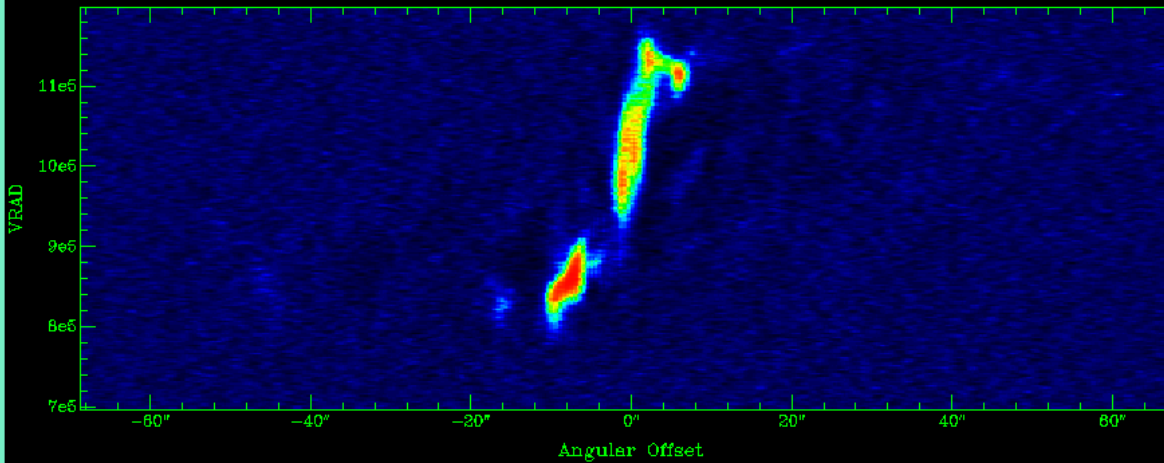
4. Imaging

➤ PVD (Position - Velocity Diagram)

x: 871 y: 998 value: blank
Ra 05h 07m 34.551s Dec -37d 28m 42.46s
VRAD: 700000 Stokes I
Centre: Ra 05h 07m 42.271s Dec -37d 30m 45.64s PA: 324.1 deg

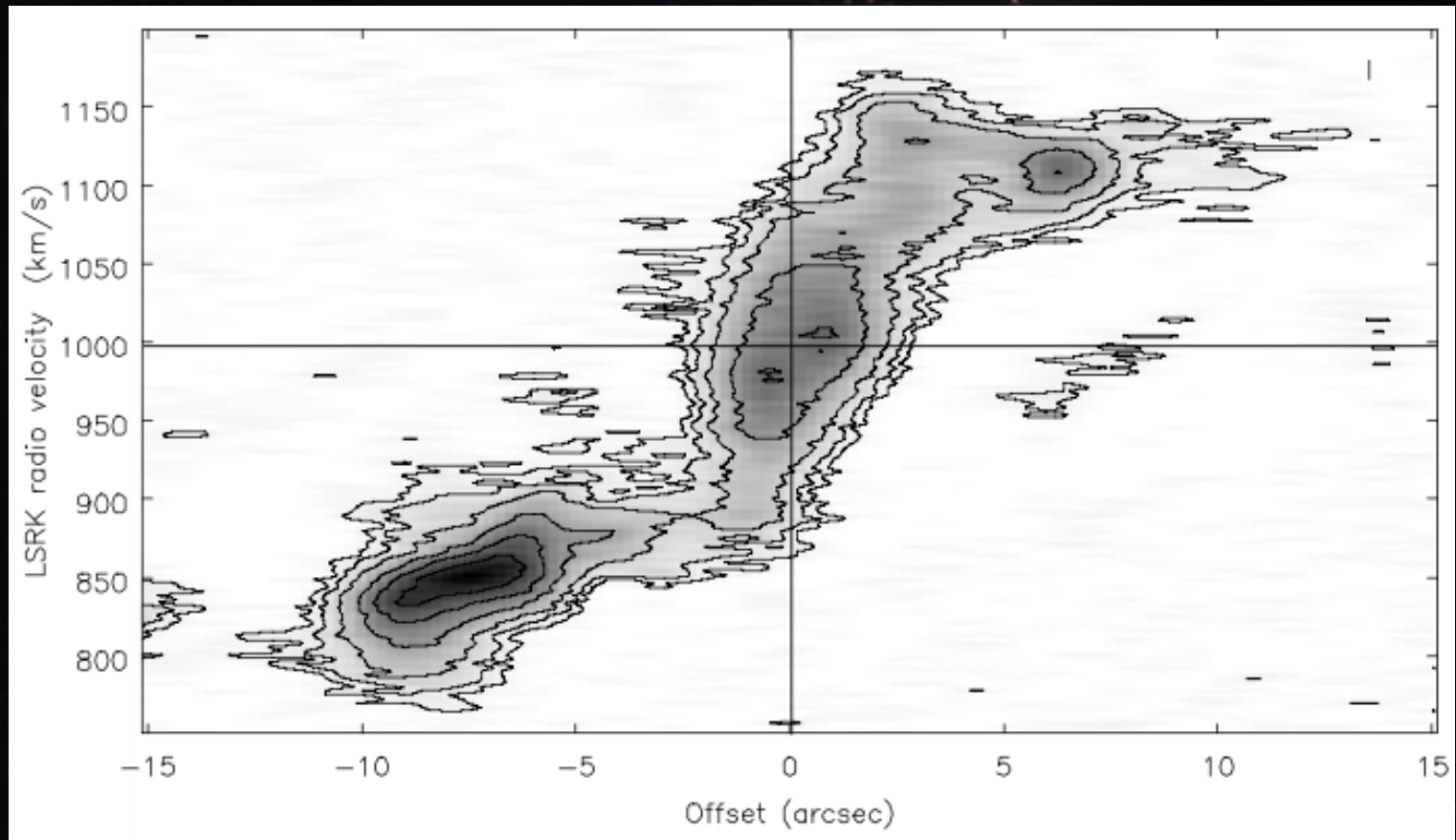


x: 152 y: 0 value: -0.000626544 Jy/beam
Offset: -0.51 arcmin u/F: 7.000000e+05
Ra 05h 07m 43.767s Dec -37d 31m 10.22s



4. Imaging

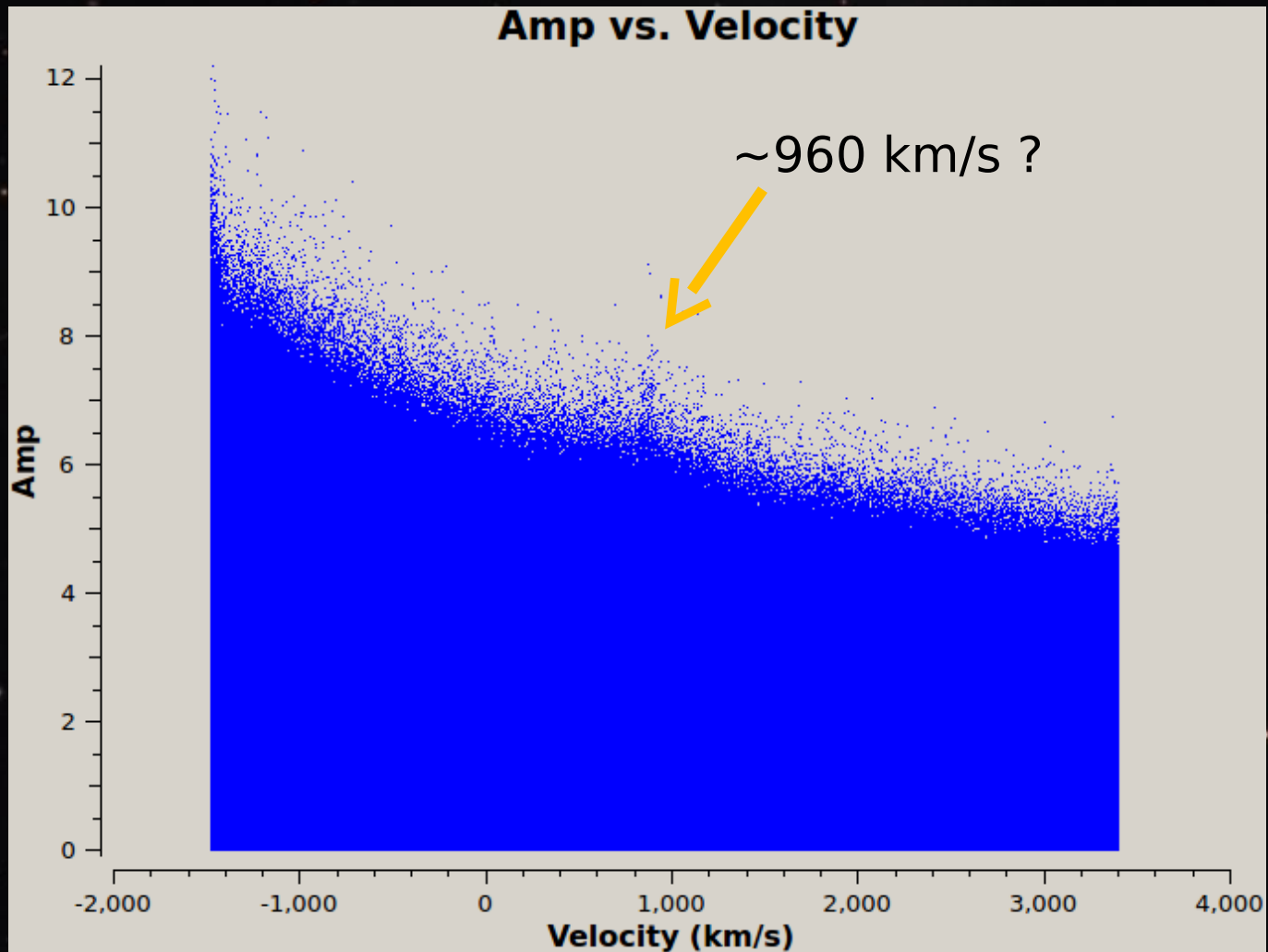
➤ PVD (Position - Velocity Diagram)



Dragan Salak et al.,
2016

4. Imaging

➤ Estimate Systemic Velocity



5. Discussion

- Molecular gas distribution and kinematics
: Four distinct components
- Molecular gas outflow
- Bar dynamics / Gas disk stability and star formation
- Comparison of gas properties : HI vs. CO
- Comparison of mass distribution : DM vs. Baryon
- Resolved Kennicutt–Schmidt Law
- GMCs scale properties
: NGC 1808 vs. MW and/or other nearby galaxies
: (e.g. M31, M33)

5. Discussion

