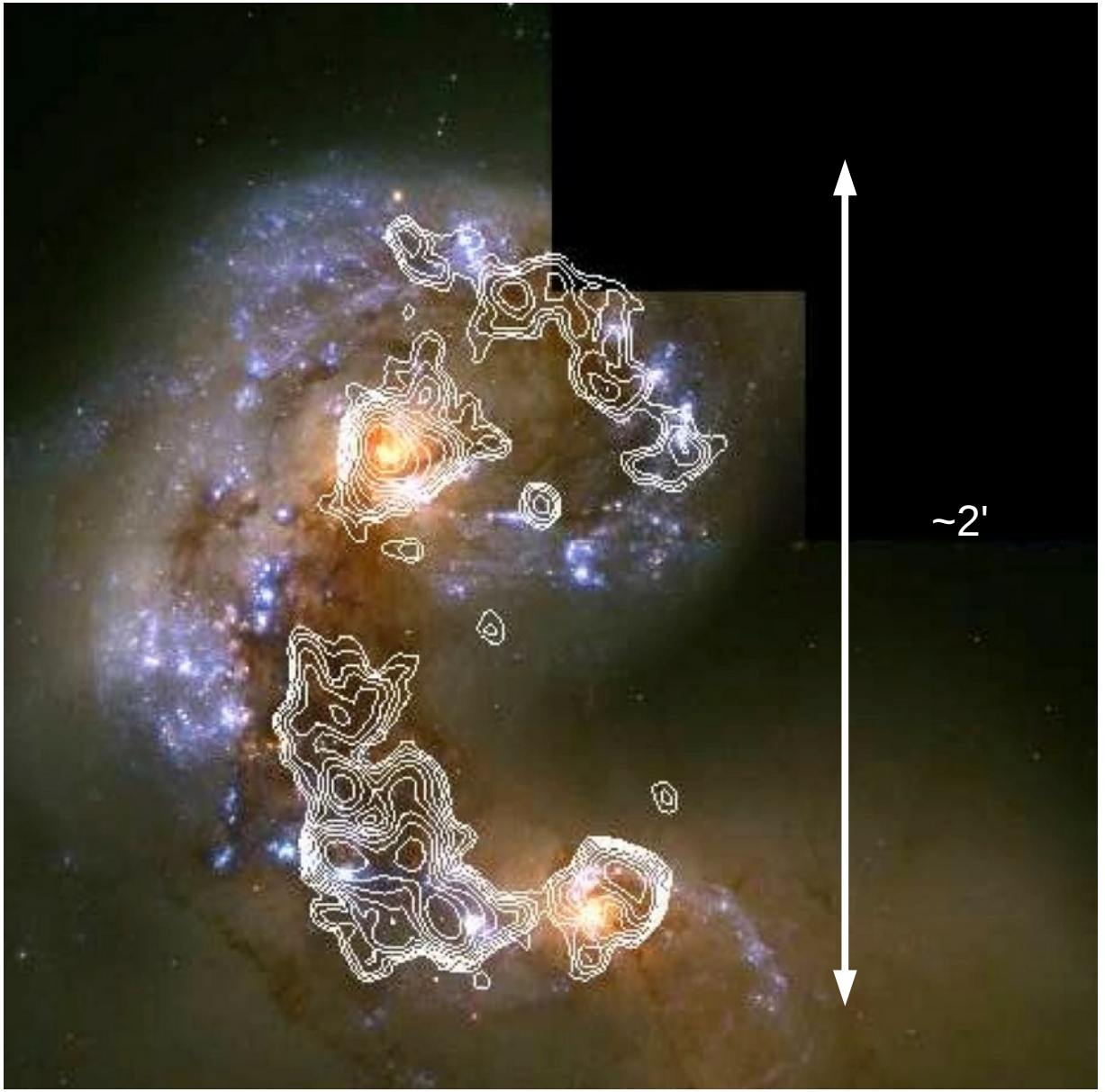
NGC4038/4039

Nearby
(z=0.005688)
interacting galaxies:
NGC4038 & NGC4039

NGC4038/4039



Wilson et al. (2000)

Observations of CO(1-0)
resolution 3”x4”

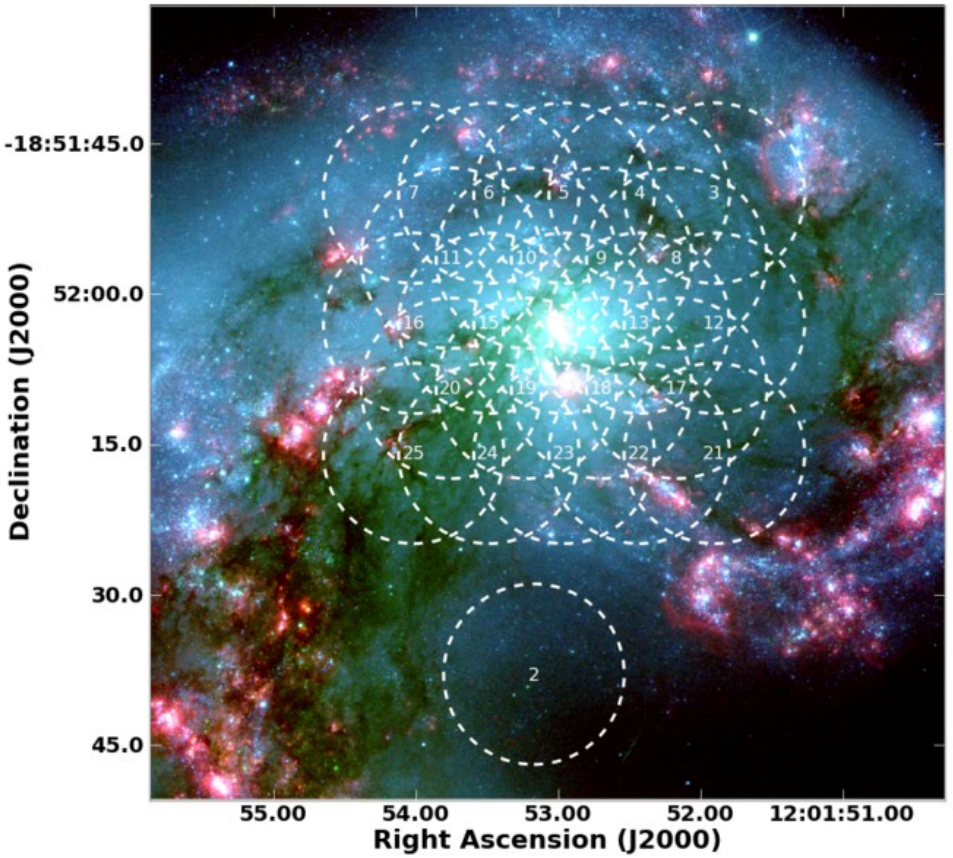
Antennae ALMA SV

ALMA Science Verification data targeting the CO (3-2) line

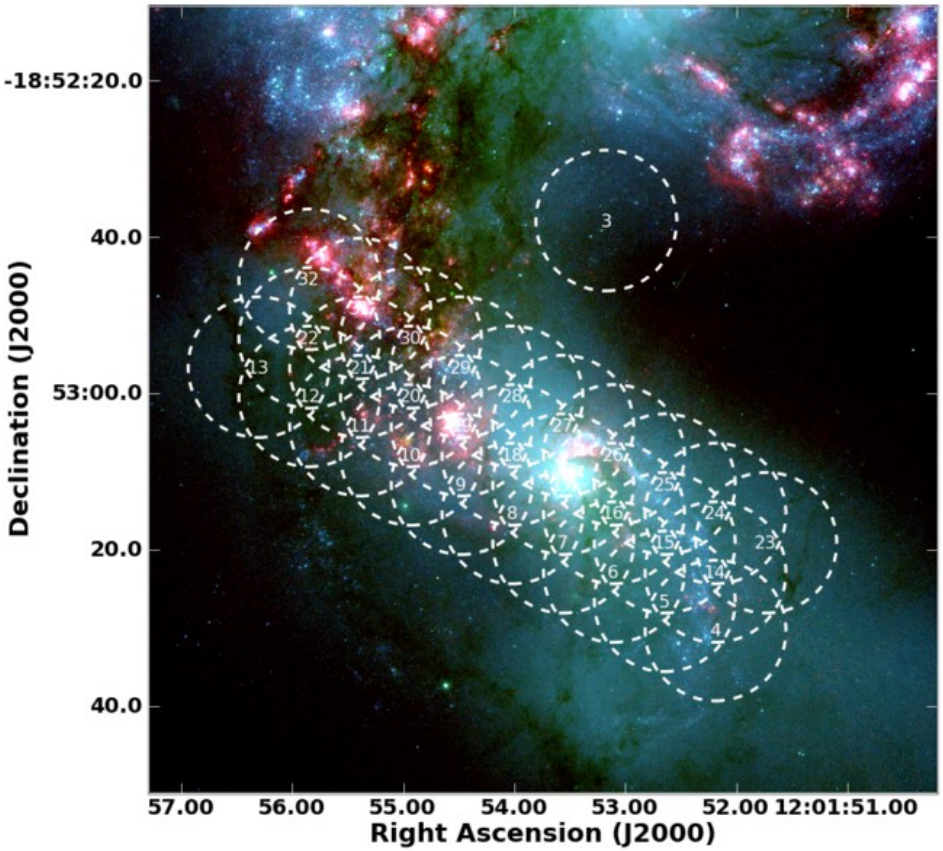
(rest frequency = 345.7960 GHz)

ALMA field of view ~ 15 “ ----> mosaics

North

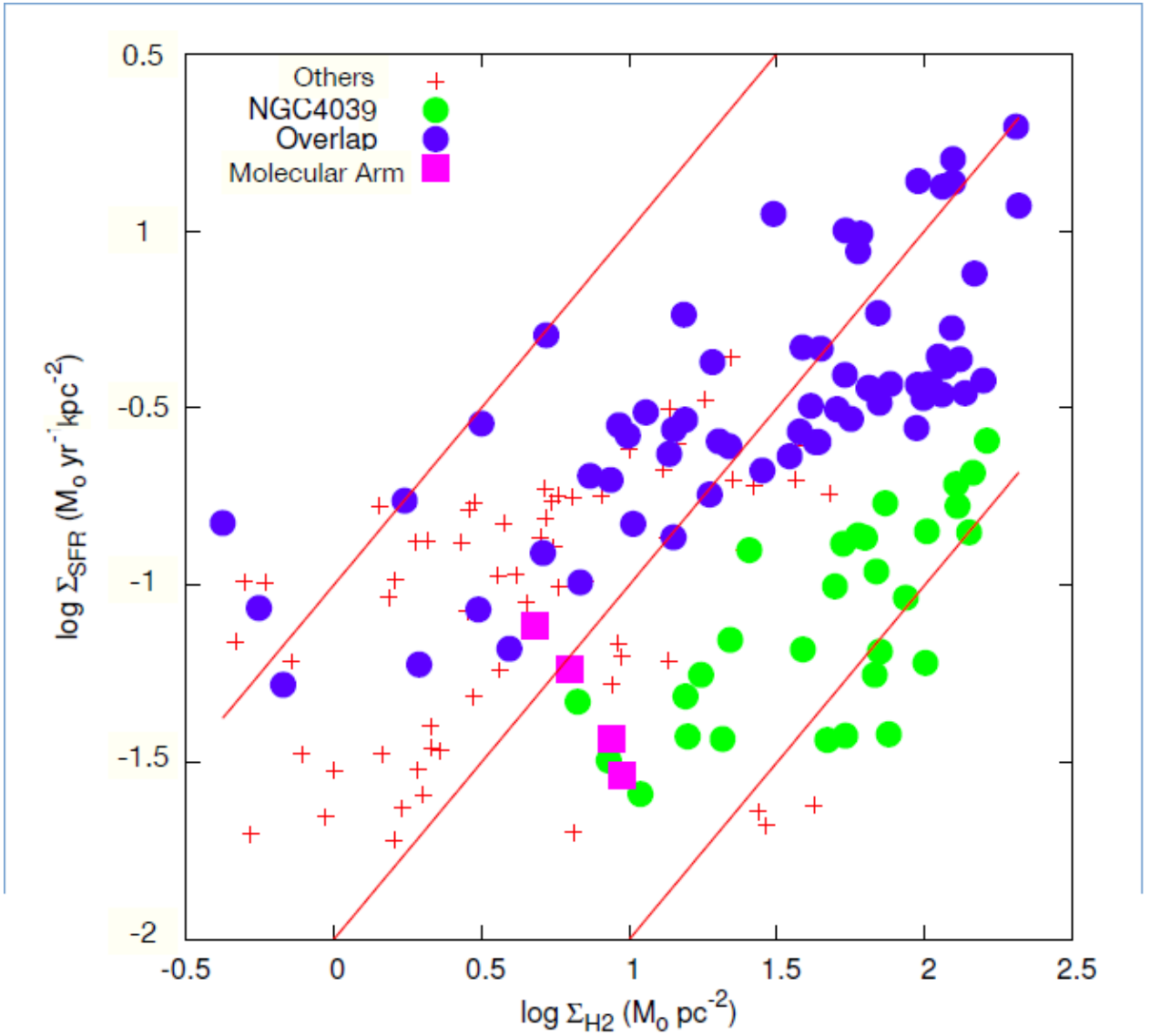


South



Misure di Σ_{H2} e SFR

Da Σ_{H2} potete ottenere un valore di SFR density



Espada et al. 2012

Misure di Σ_{H2} e SFR

Relazione fra la luminosita' del CO e la massa del gas molecolare

$$M_{H2} = \alpha_{CO} L_{CO}$$

In Antennae:
α_{CO} = 4.8 M⊙ (K km s^{-1} pc^2)$^{-1}$ (Zaragoza-Cardiel 2014)

La luminosita' del CO si puo' calcolare usando:

$$L_{CO}[K\ km\ s^{-1}\ pc^2] = 3.25\times10^7\ \nu_{rest}^{-2}\ (1+z)^{-1}\left(\frac{D}{Mpc}\right)^2\left(\frac{F_{CO}}{Jy\ km\ s^{-1}}\right)$$

(Solomon 1992)

Per il nostro target D=22 Mpc, ν_{rest} = 345.796 GHz e z= 0.0056

Antennae ALMA SV

Southern mosaic dataset:

uid://A002/X1ff7b0/X1c8

uid://A002/X207fe4/X1f7

uid://A002/X207fe4/X4d7

uid://A002/X215db8/X1d5

uid://A002/X215db8/X392

uid://A002/X215db8/X18

Northern mosaic datasets:

uid://A002/X1ff7b0/Xb

uid://A002/X207fe4/X3a

uid://A002/X207fe4/X3b9

uid://A002/X2181fb/X49

- **Calibration of one single dataset.**
- Imaging and analysis of combined datasets.

Datasets

uid___A002_*.wvrtsys.ms

have been obtained applying wvr and tsys correction to raw data and splitting the raw and data columns

Tables:

uid___A002_*.tdm.tsys

have been obtained from the raw data

the spw corresponding to the target line is spw 5

In dir: /arcfs0/homesarc/almauser0/ANTENNAE/

***.wvrtsys.ms : datasets**

***.tdm.tsys : Tsys tables**

uid___A002_X1ff7b0_X1c8	CLara
uid___A002_X207fe4_X1f7	Cecilia Matilde
uid___A002_X207fe4_X4d7	i 3
uid___A002_X215db8_X18	
uid___A002_X215db8_X1d5	Francesco Guido
uid___A002_X215db8_X392	Davide Matteo
uid___A002_X1ff7b0_Xb	Giulia Riccardo
uid___A002_X207fe4_X3a	Daniele Andrea
uid___A002_X2181fb_X49	Elena Giovanni
uid___A002_X207fe4_X3b9	

- **Ispezione delle tabelle di Tsys per le singole antenne**
- **Evidenziare gli effetti prodotti dalle correzioni di Tsys e WVR**
- **Flag a priori**
- **Calcolo del rms atteso in riga e in continuo (su un singolo puntamento del target)**
- **Flag da analisi dati (Tsys e visibilita')**
- **Split dei dati calibrati (a priori)**
- **Calibrazione**
- **Imaging e momenti**
- **Analisi dei risultati: rms delle immagini, larghezza e picco della riga, e proprieta' delle nubi.**

- **execfile('/arcfs0/homesarc/paladino/init.py')**
  aU.timeOnSource(ms)

- **cp -r ../../almauser0/Antennae_cali/Antennae_North.cal.ms**
  cp -r ../../almauser0/Antennae_cali/Antennae_South.cal.ms

- **cp -r ../../almauser0/Antennae_North*2L* .**
- **cp -r ../../almauser0/Antennae_South*2L* .**

- **Sensitivity=**

$$\sigma = \frac{2k}{\eta A_{sd}} \frac{T_{sys}}{\sqrt{N(N-1)\delta\nu\delta t\, n_p}}$$

https://almascience.eso.org/proposing/sensitivity-calculator

Parametri del Clean

Imagermode='mosaic'
Restfrequency='345.79GHz'

North

Phasecenter='12'
Imsize=500
cellsize=''
threshold=''

South

Phasecenter='15'
imsize=750
cellsize=''
threshold=''

sulle immagini

- rms delle immagini in canali
- Larghezza della riga
- Picco della riga

Misure di Σ_{H2} e SFR

Dalla mappa di Integrated intensity (Moment 0) misurate in una o piu' regioni:

$$F_{CO\,(3-2)}\left[\,Jy\,km\,s^{-1}\right]$$

Convertite in L_{CO} e calcolate la massa di H2 in quella regione.

Stimate approssimativamente le dimensioni lineari della regione e da li' la densita' superficiale di H_2.

Nel grafico Σ_{H2} e' espressa in $M\odot\ pc^{-2}$.