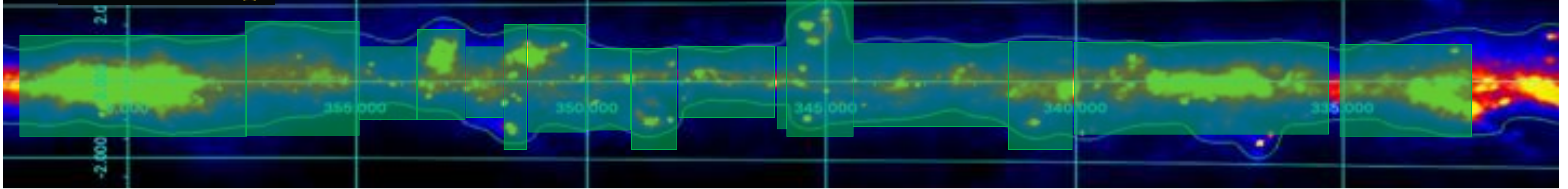


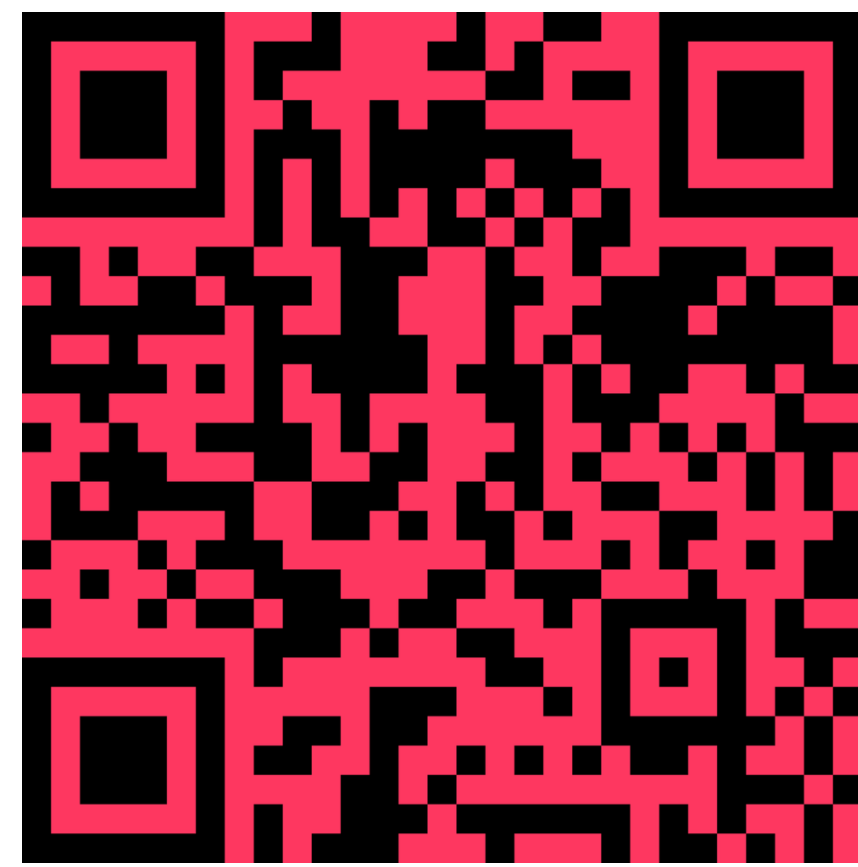
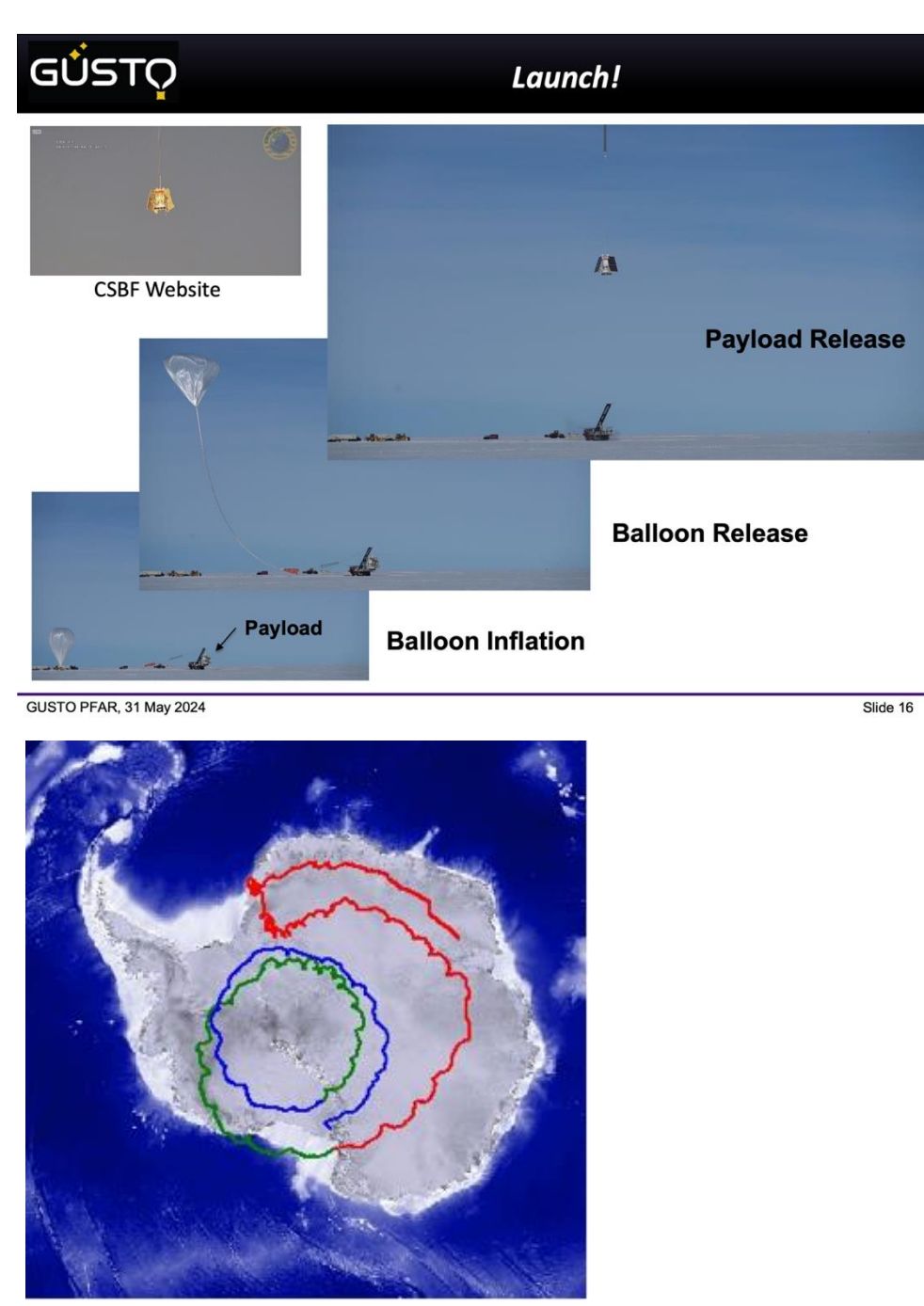
# GUSTO Galactic Plane Legacy Survey in NII and CII



R. Shipman (SRON/RuG), A. Blanchot (RuG), D. Burkovska (RuG), C. Kulesa (U of Arizona), C. Walker (U. of Arizona), A. Young (U. of Arizona), I. Kamburov (RuG), V. Tolls (CfA), C. Martin (Kalvi), P. Goldsmith (JPL), J. Pineda (JPL), P. Bernasconi (APL/Johns Hopkins), G. Melnick (CfA), B. Peters (U. Arizona), D. Hollenbach, M. Wolfire, A.G.G.M. Tielens (U. Leiden), F. van der Tak (SRON/RuG), E.M. Ghosh (SRON/RuG), A. Stark (CfA), E. Young, D. Neudfeld, H. York

Contact: R.F.Shipman@sron.nl

**Galactic/Extragalactic ULDB Spectroscopic Terahertz Observatory**  
 University of Arizona, NASAGSFC Explorers Program  
 APL gondola/operations  
**Record breaking 57 day flight**



Access to  
GUSTO DR 2

Survey Region	Coverage	Key features
Galactic Plane	deg <sup>2</sup> from 2.7° > l > -28° and  b  < ~1.2°	Velocity resolved fine structure lines ([NII] and [CII])
LMC	2 deg <sup>2</sup>	Targeted survey for star formation studies
NGC 3603	0.5 deg <sup>2</sup>	Deep sensitive integration

Mission Specs		Resolution
Antenna	90 cm	1' @NII 0.75'@CII
NII 2x4 Array	1.4 THz 3 active mixers	4 km/s
CII 2x4 Array	1.9 THz 2 active mixers	2 km/s
Mixers	Hot Electron Bolometer	
Map strategy	On-the-fly (OTF)	Nyquist sampled

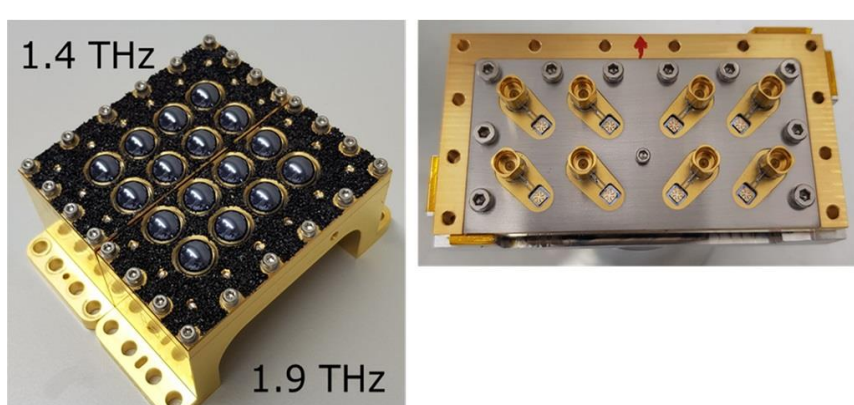
## Data Release 2:

- L1 calibrated OTF spectra (1 spectrum per mixer per OTF readout)
- Pointing reconstruction good to 2'
- Instrument artefacts removed
- Stable calibrations applied.
- Low order polynomial applied to baseline

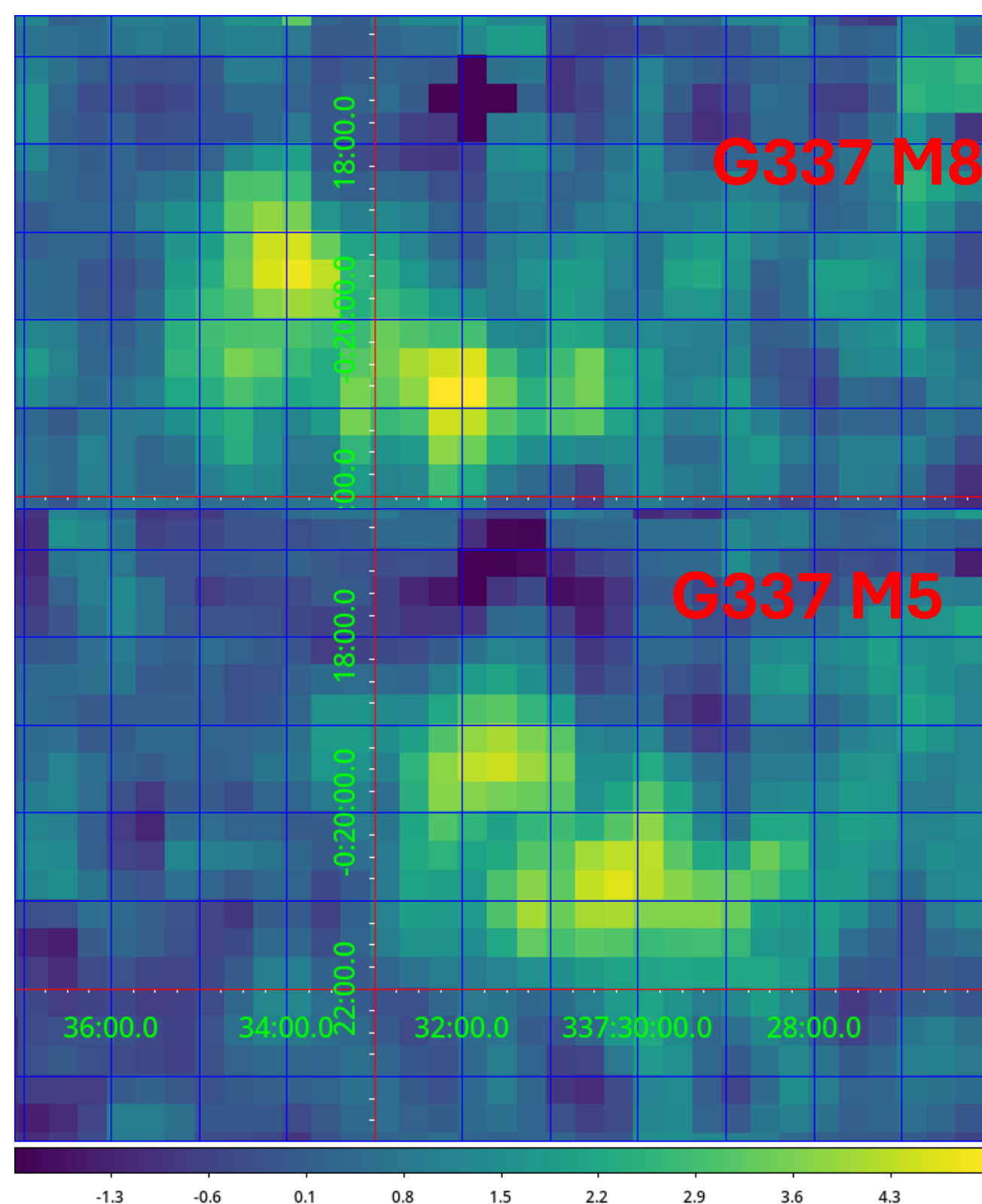
## Road to DR3:

- Calibrate mixer offset positions.
- Finalize pointing reconstruction.
- Improve/address instrument stability
- Create data cubes (combine all active mixers to highest instrument spectral and spatial resolution)

## Data/Instrument Calibration

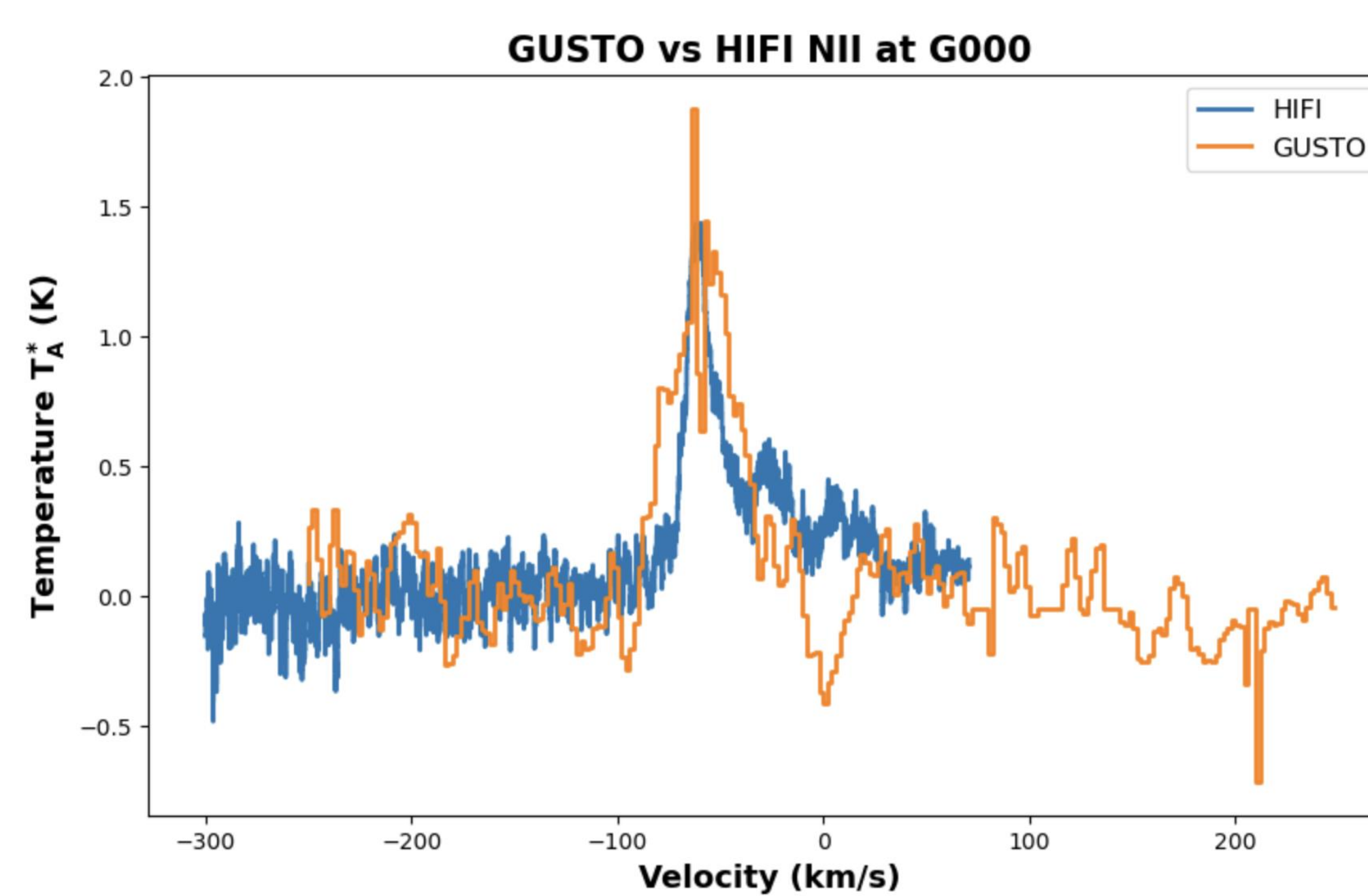


SRON HEB arrays for CII, NII  
 Silva, J., Laauwen, W., Mirzaei, et al., 2025, JATIS, Vol. 11, Issue 1, 016001



Determine mixer offsets on sky. CII mixer 8 is aligned on boresight, all other are offset in the focal plane.  
 Images: slice 102 km/s for data cube of M8 and M5

## Cross Calibration



GUSTO and Herschel/HIFI spectra of NII toward the Galactic Center (Pineda, Langer, Goldsmith 2014, A&A 570, A121). The data show good agreement in the line shape and velocity structure.

Position l 0, b 0:

- HIFI data single pointing, 7" beam
- GUSTO data cube pixel at same point 2' resolution.

## Science

Dust emission identified HII region, RCW122, in WISE Catalog of HII regions (Anderson et al. 2014, ApJ Sup. Ser. 212). Image (top): slice at 18 km/s of data cube. Spectrum (bottom): average of pixels inside of white circle.

