An HF J=1-0 1.23 THz Molecular Line Survey toward the Nuclei of Infrared Luminous Galaxies

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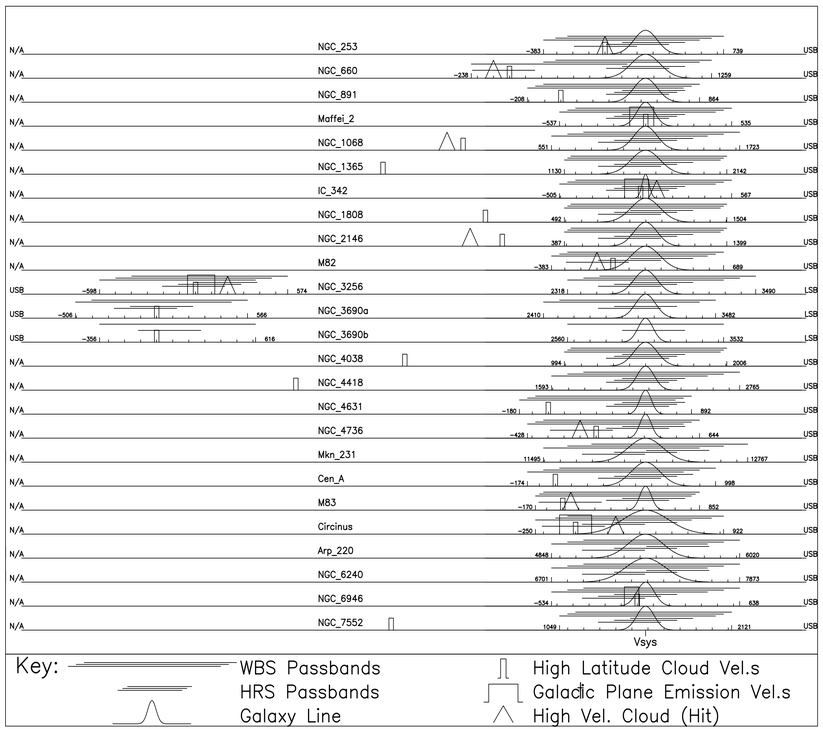
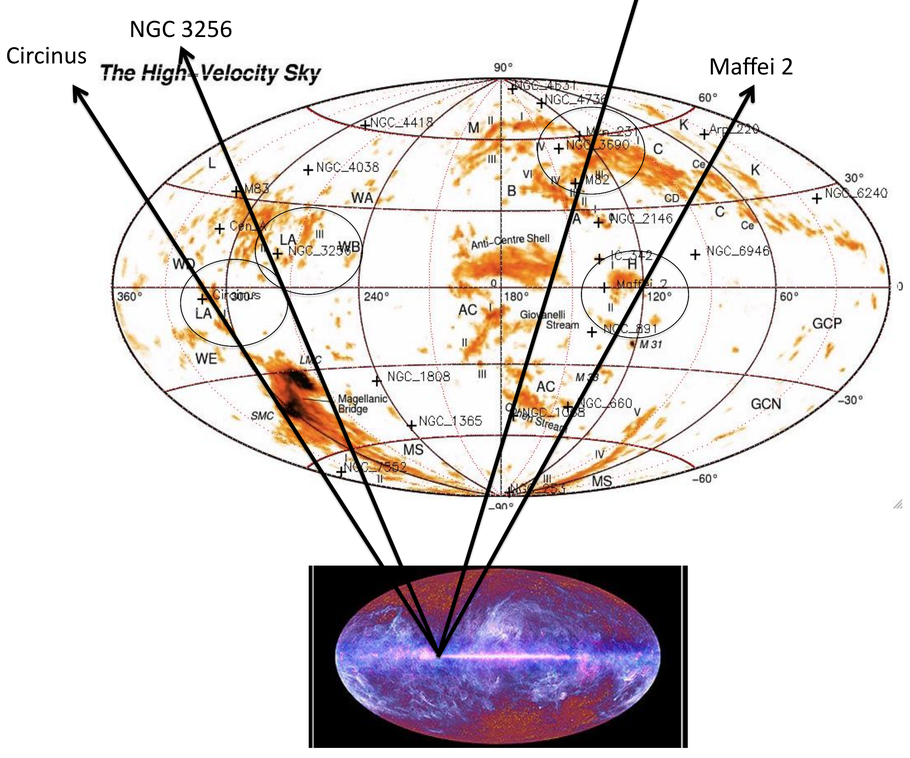
We observed 15 galaxies with HIFI at the 1.23 THz (243 um) transition of HF (J=1-0). The line was unambiguously detected in 3 sources: in NGC 253 (emission and absorption), and in M82 in absorption, and Mrk 231 in emission (see immediately below). The detections confirm previous SPIRE detections, but more importantly serve to resolve the line profiles

We also searched for line-of-sight absorption from Milky Way Clouds including high latitude sources.

Superposition of Galactic and Extragalactic Velocities



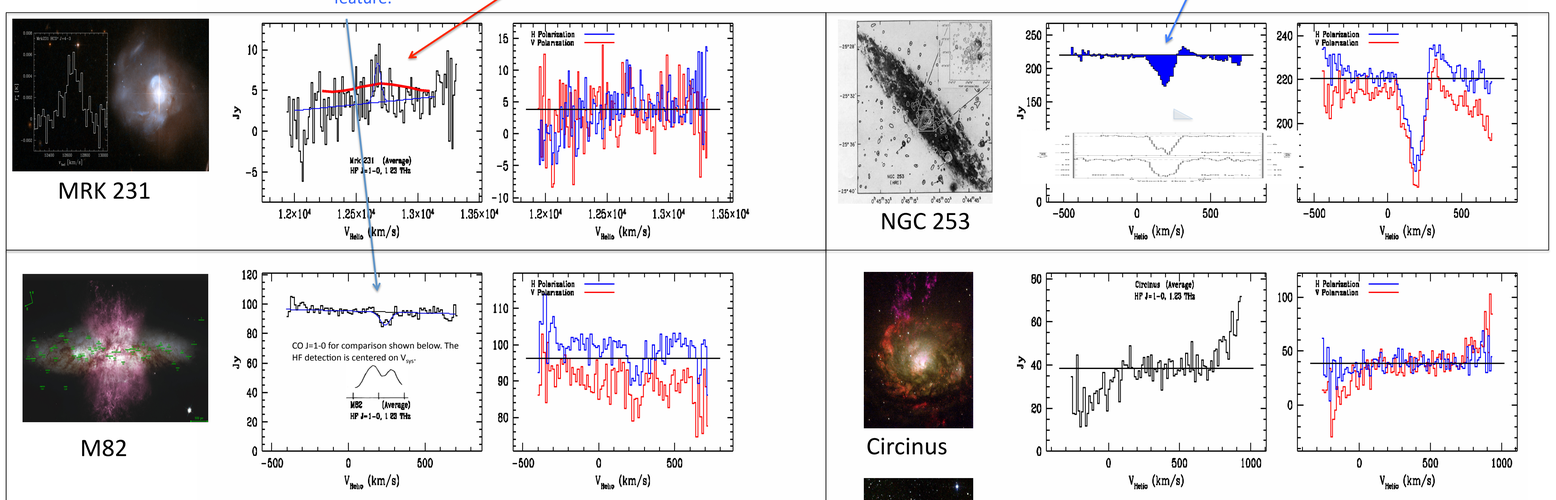
- Above, we show the HIFI sideband possibly containing the line, and other possible clouds (Galactic Plane, High Latitude or High Velocity) in the two sidebands.
- Below, labels for the galaxies of the survey are overlaid on the high velocity Milky Way Clouds found along their line-of-sight.



Mrk 231 SPIRE Detection (Van der Werf) (broad red hump) resolved by HIFI! (blue peak). Likewise, M82 absorption feature.

The 2nd column shows the H and V polarization separately. They should agree to confirm a detection.

NGC 253 detection in 3 LO setting with HIFI showed such excellent signal to noise that it could be deconvolved from the double sideband. Here HF absorption and emission is compared with H_2CO absorption.



(At this frequency, the HIFI Beam is 19").

Future work: Refined modeling using line profiles is underway. Advanced data reduction techniques are being applied.