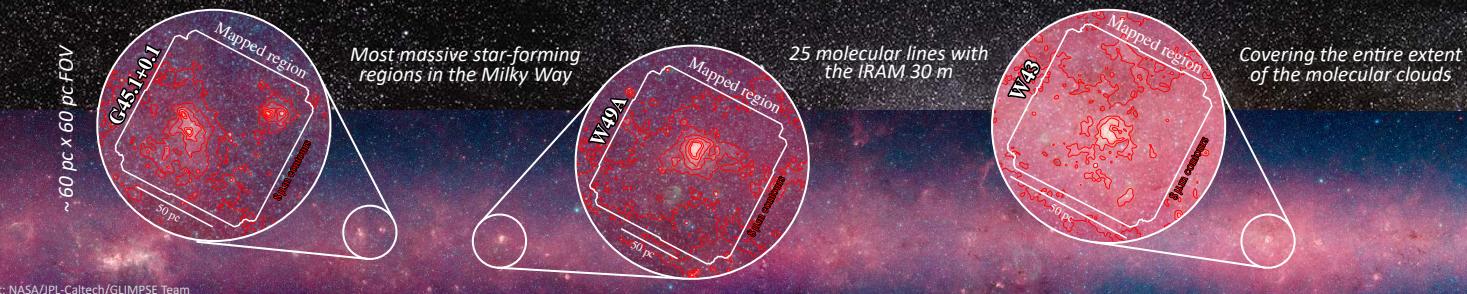


# LEGO: Connecting probes of dense gas from the Milky Way to external galaxies



Lukas Neumann (ESO fellow), Ashley Barnes, Frank Bigiel, Jens Kauffmann & the LEGO team

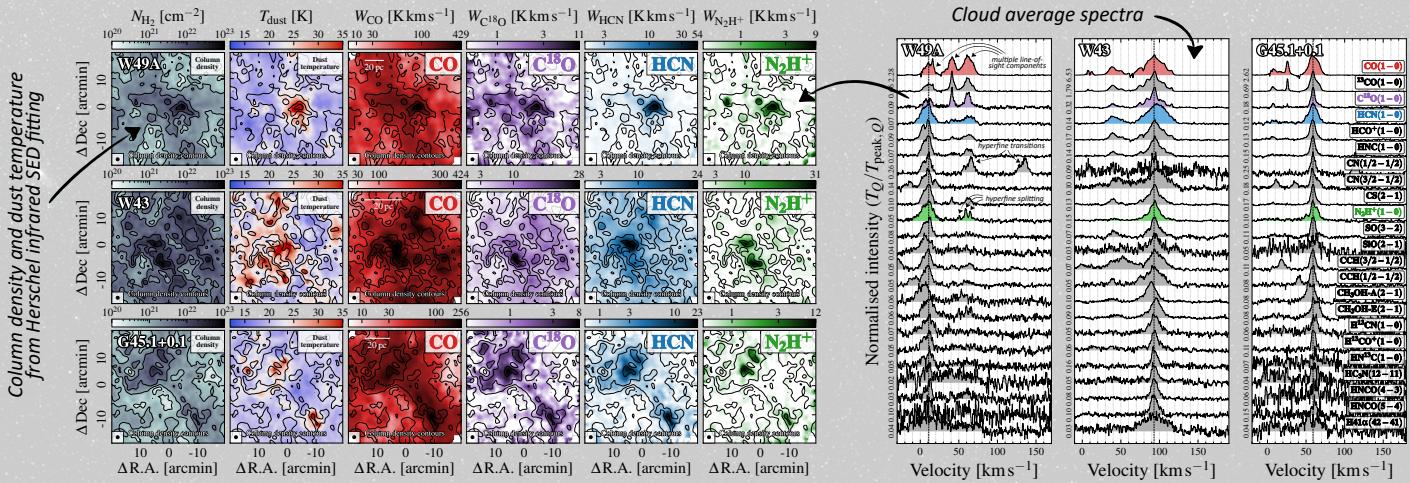
## LEGO = Line Emission as a tool for Galaxy Observations



Credit: NASA/JPL-Caltech/GLIMPSE Team

### The extragalactic perspective on Galactic star-forming regions

#### Molecular line emission across massive star-forming regions with the IRAM 30 m



#### Emissivity of dense gas probes

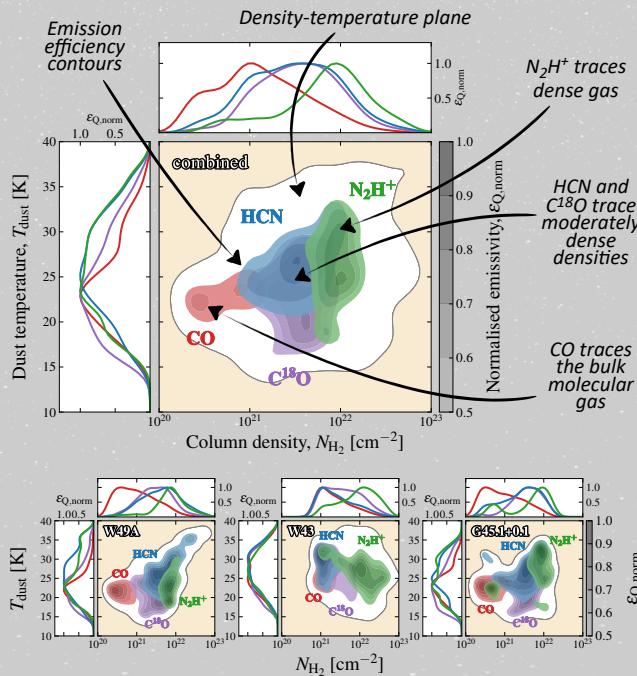


Figure: Emission efficiency of molecular lines in the column density-dust temperature plane.

#### Connection to nearby galaxies

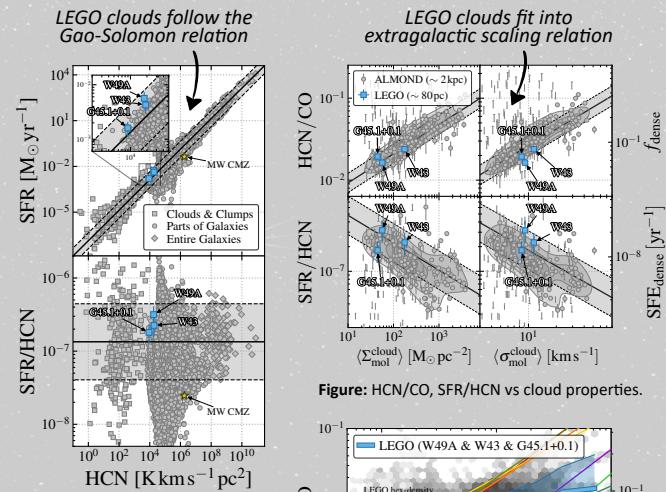


Figure: HCN/CO, SFR/HCN vs cloud properties.

Figure: Gao-Solomon relation.

HCN/CO is a powerful tool to track average gas density from parsec to kiloparsec scales

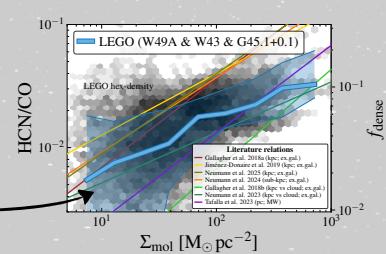


Figure: HCN/CO vs surface density.

Literature relations:  
 - Gallagher et al. 2018 (dpc; ex.gal.)  
 - Neumann et al. 2019 (dpc; ex.gal.)  
 - Neumann et al. 2020 (dpc; ex.gal.)  
 - Neumann et al. 2020 (obs; ex.gal.)  
 - Neumann et al. 2021 (dpc; ex.gal.)  
 - Neumann et al. 2021 (obs; ex.gal.)