

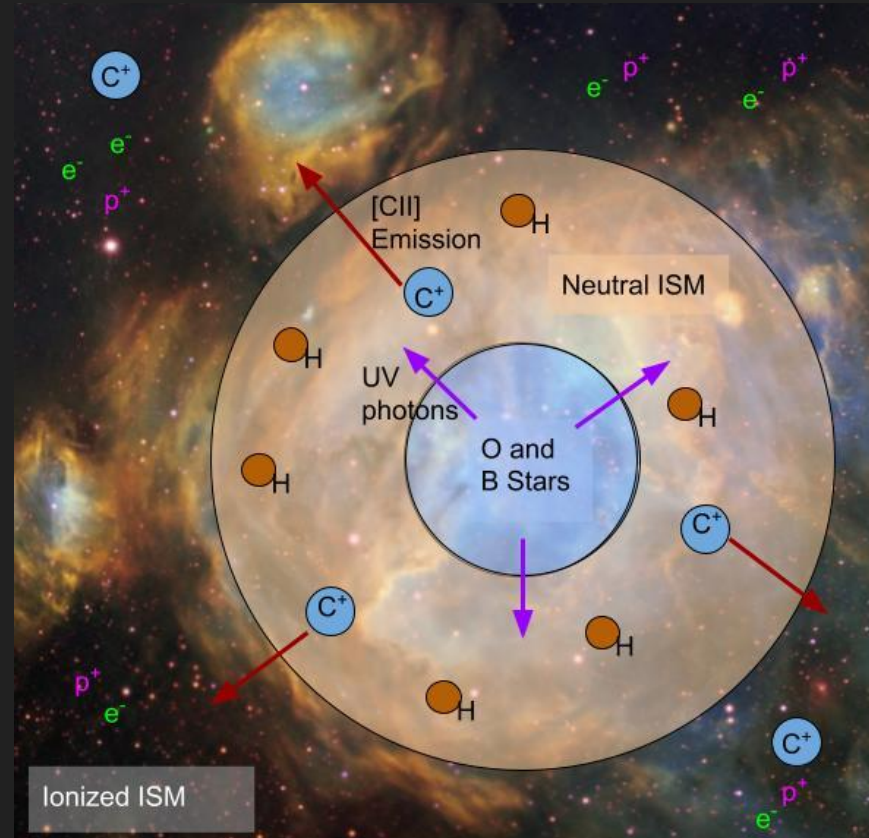
A Map of the Molecular Ring and Arms of a Spiral Galaxy

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Ionized Carbon Emission ([CII])

- Model Interstellar Medium (ISM)
- Young O and B stars heat the ISM
- C^+ cools the ISM through [CII] emission



Ionized Carbon Emission ([CII])

- Often brightest emission line
- Potential tool for measuring star formation rates, molecular gas in the early universe
- Still a lot of unknowns
- Currently only detectable by SOFIA in the local universe

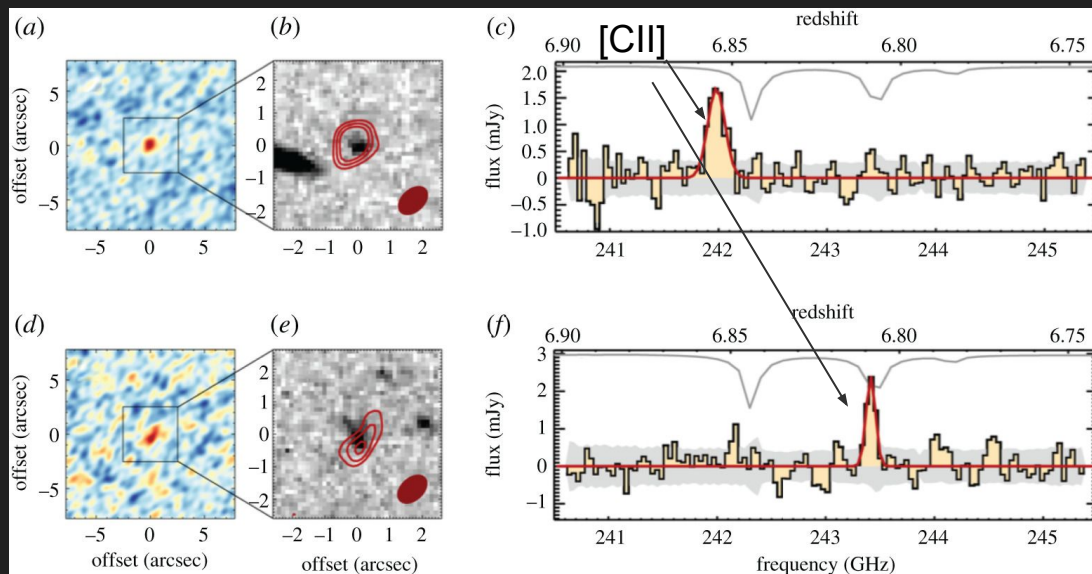


Image Credit: Hodge & da Cunha, 2020

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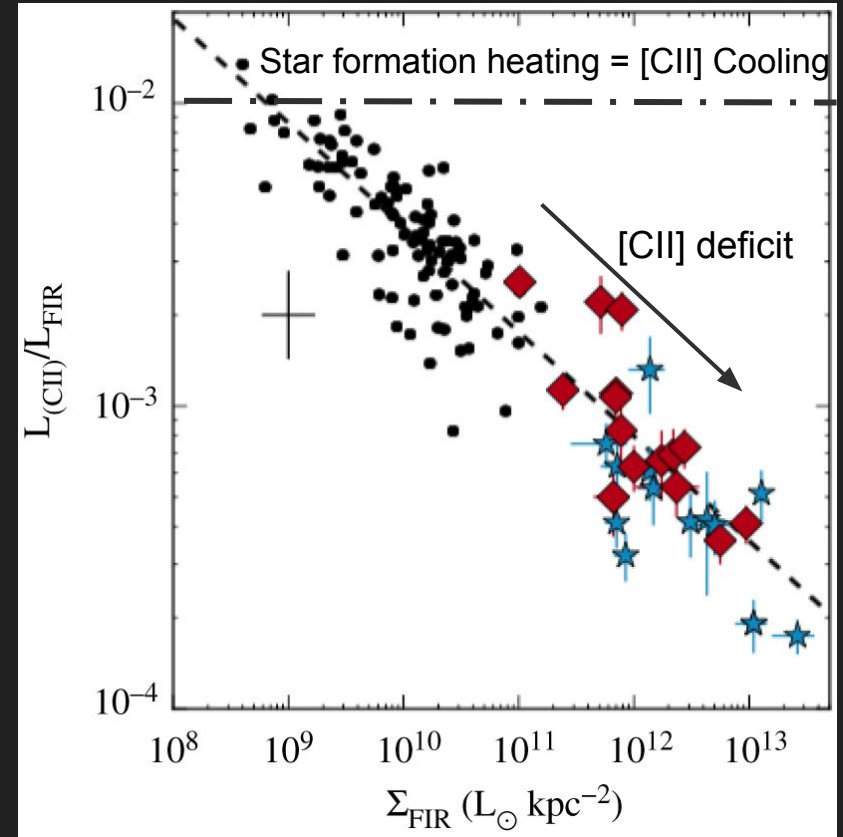


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Ionized Carbon Emission

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[CII] Map of NGC 7331

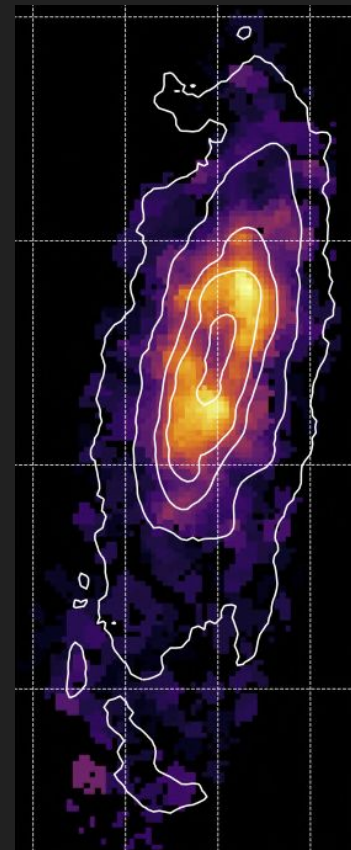
- Nearby (14 Mpc), highly-inclined (72°) galaxy
- Milky Way twin
- IR bright Molecular ring
- Mapped with the FIFI-LS instrument



Optical (SDSS)



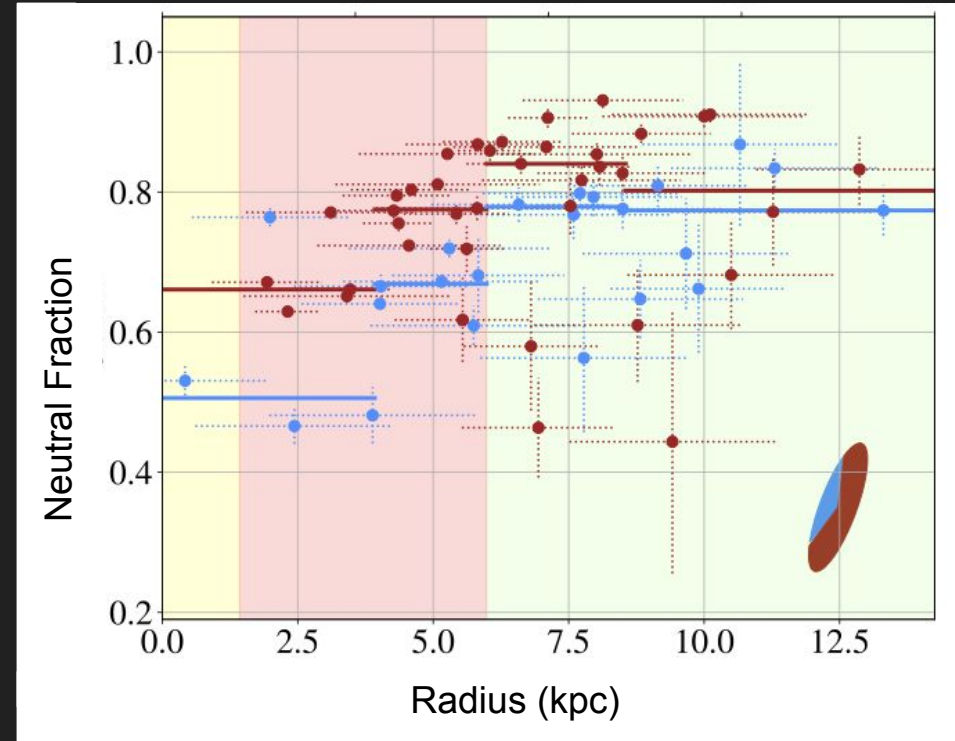
Infrared (Spitzer)



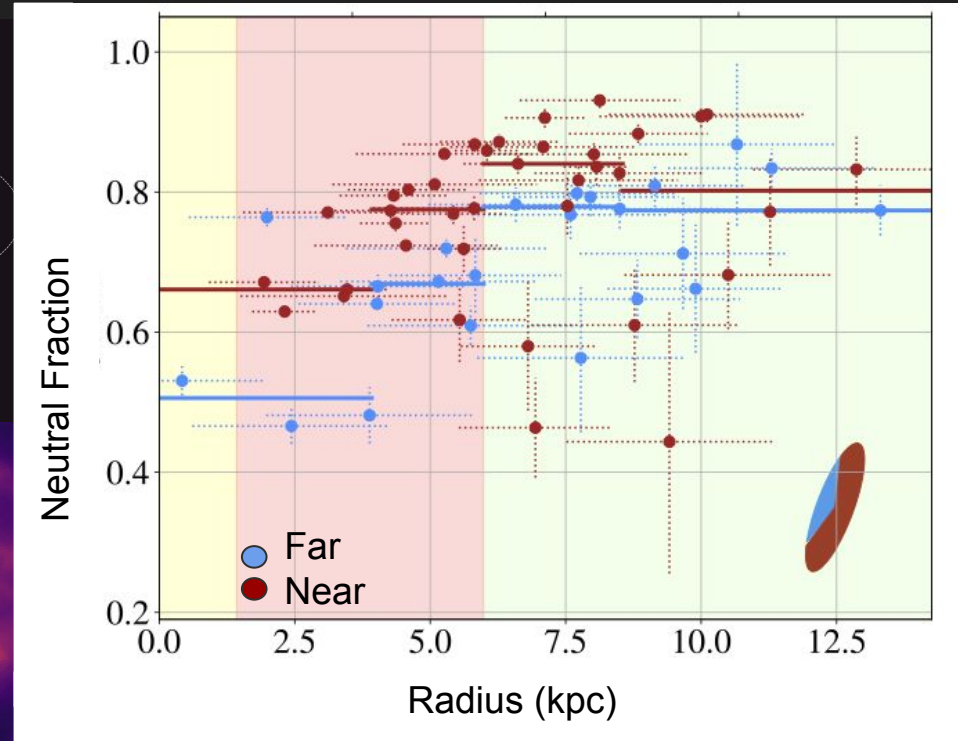
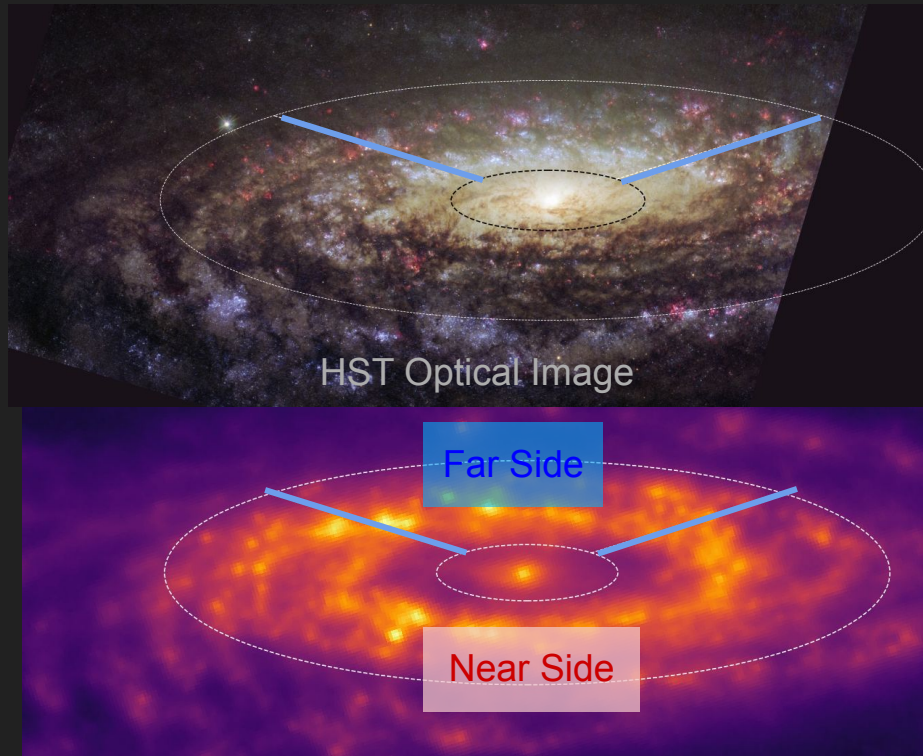
[CII] Map (SOFIA)

Origin of the [CII] Emission

- Determine the fraction of [CII] emission from neutral ISM
- Azimuthal and radial dependencies suggest environmental differences in [CII] origin location

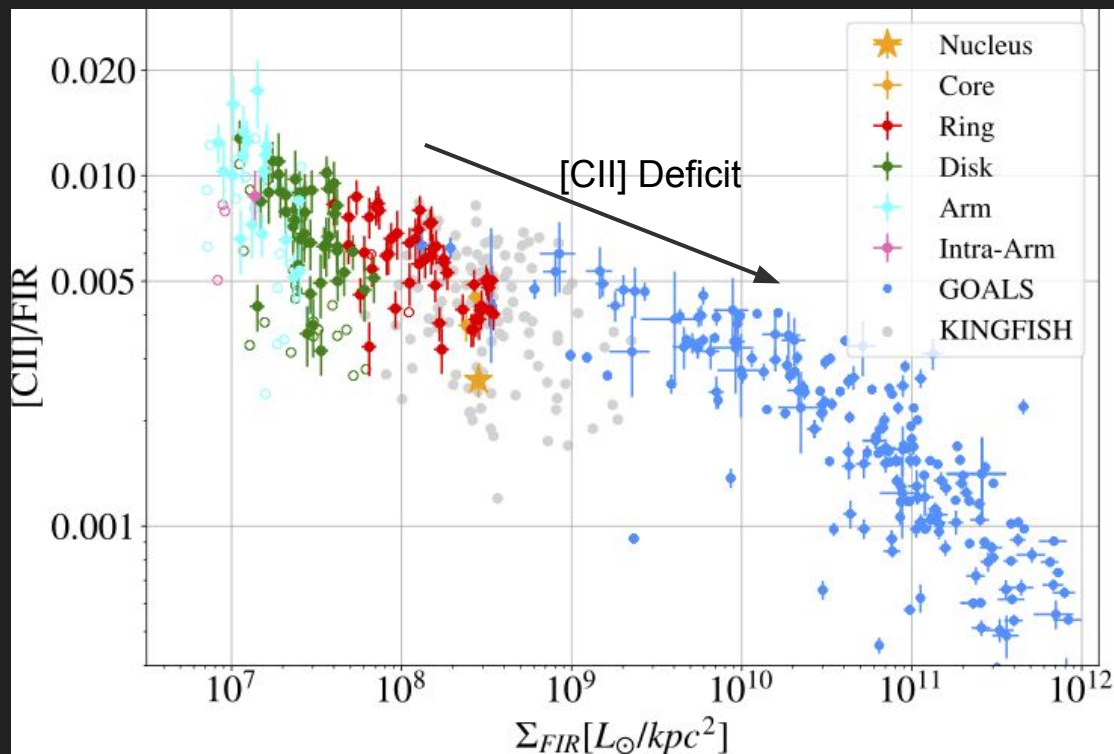


Dependance on Observing Perspective



Local Extension of [CII] Deficit

- Added data from NGC 7331 to plots of [CII]/FIR
- See a clear extension of trend



Conclusions

- We present a new [CII] map of NGC 7331
 - See effects of observing perspective
 - Measure local, low luminosity extension of [CII] deficit
 - Measure [CII] emission across bright molecular ring
- Further [CII] maps are needed to demystify high-z counterparts



Image Credit: NASA/JPL-Caltech/UCLA

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ADDITIONAL SLIDES

Ionized Carbon Emission ([CII])

