The infrared spectra of AGN with Herschel and Spitzer

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Outline

Why IR spectroscopy?

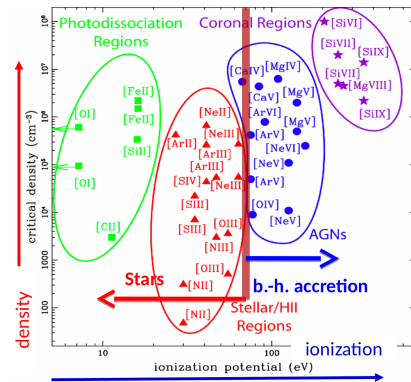- **Avoid** most of **extinction**

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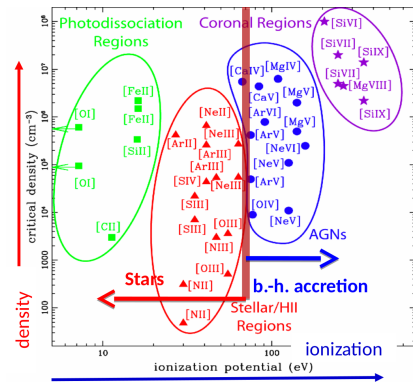- Trace **SF** and **AGN**

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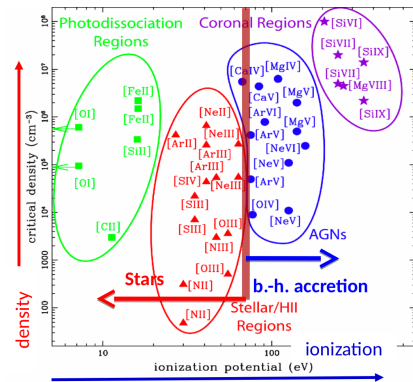- Separate physical mechanisms

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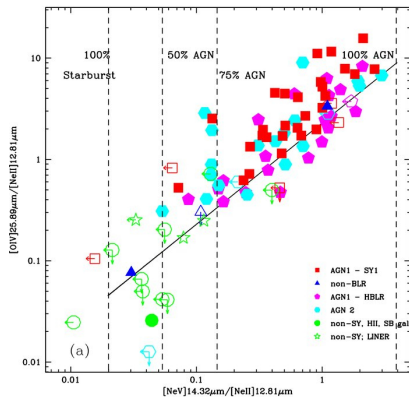- OH: outflows (Sturm+2011; Spoon+2013; Veilleux+2013)

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- High CO lines: >CO(13-12)
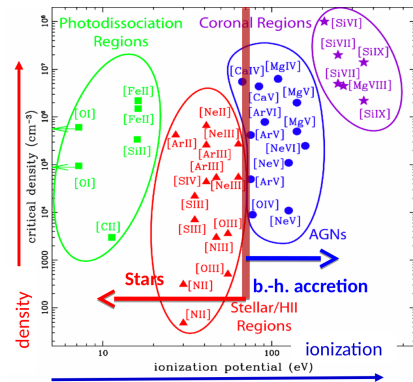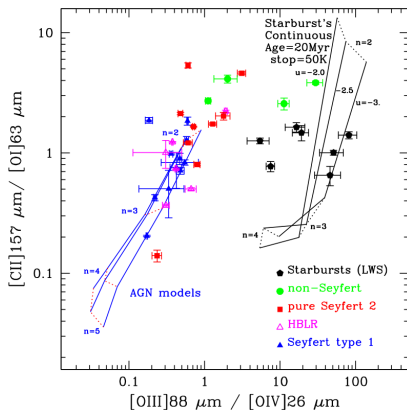
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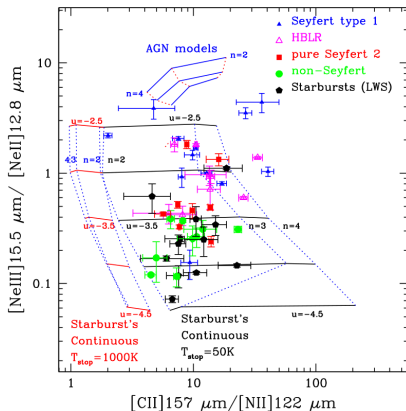
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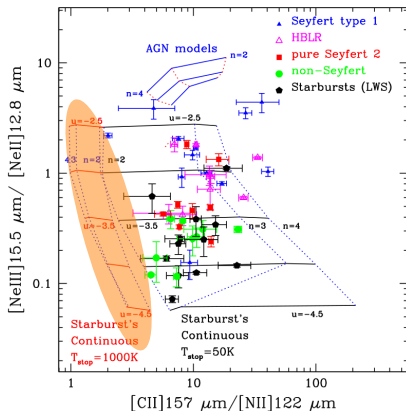Disentangle **AGN/Starburst/PDR**

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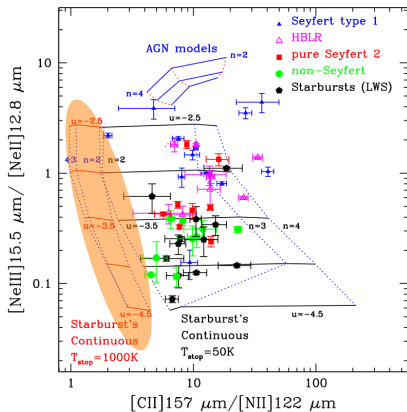

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Extension to **all AGN** in **Spitzer + Herschel**

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  [NeII] 12.8 μm; [NeIII] 15.6 μm; [NeV] 14.3, 24.3 μm; [OIV] 25.9 μm; [SIII] 18.7,

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- + **43 Dwarf** galaxies (Cormier+2015)

- + **22 Starburst** galaxies

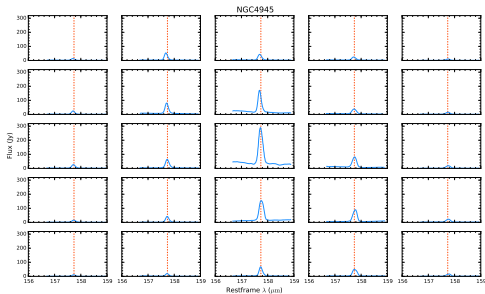 (Bernard-Salas+2009; Goulding & Alexander 2009)

Dataset

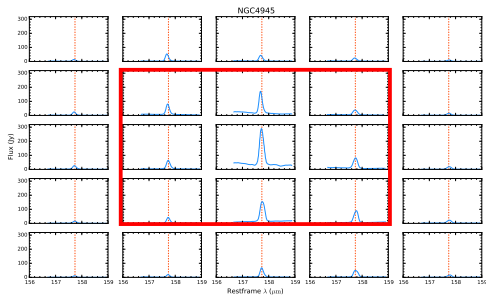• Background subtraction
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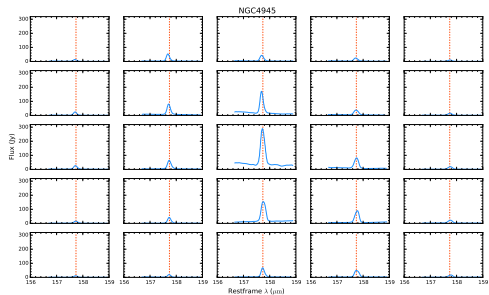
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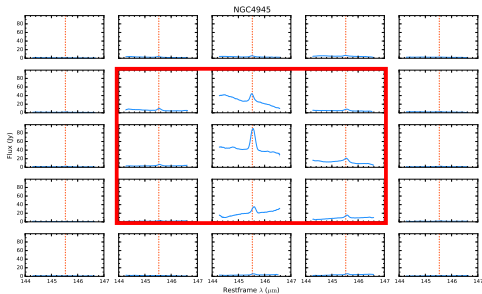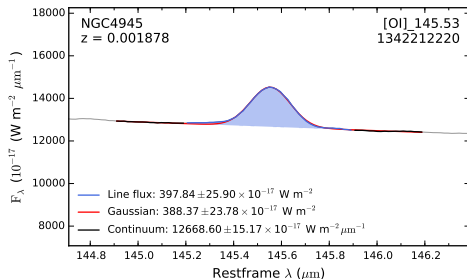 FOV: 45″ × 45″

NGC4945

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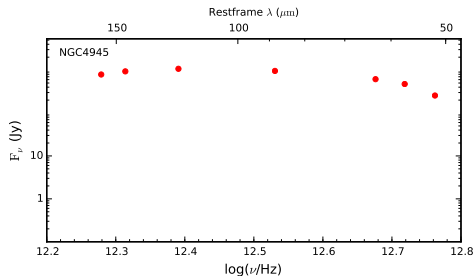

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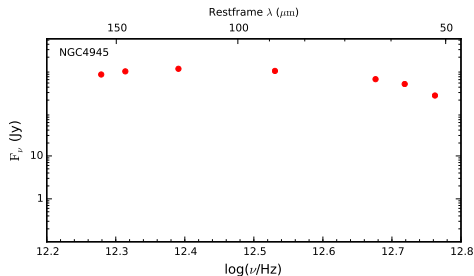- Line flux, cont., sigma

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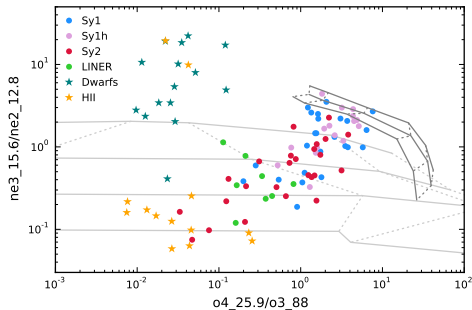- Line flux, cont., sigma

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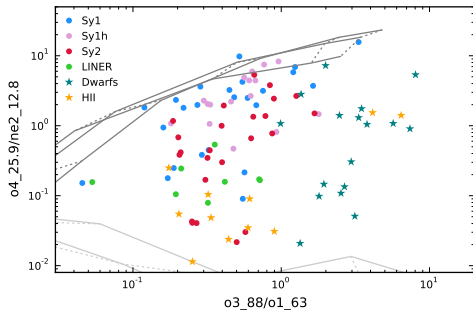- Line flux, cont., sigma
- **CLOUDY** models

SED

Diagnostics

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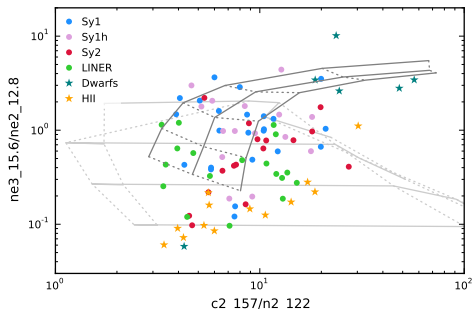
Fernández-Ontiveros et al. in prep.

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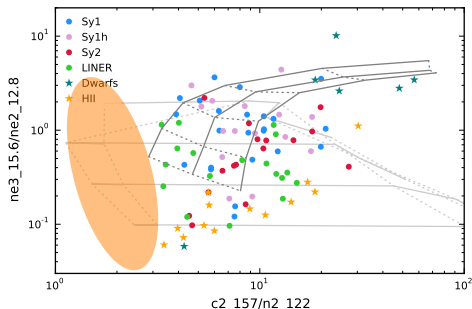Fernández-Ontiveros et al. in prep.

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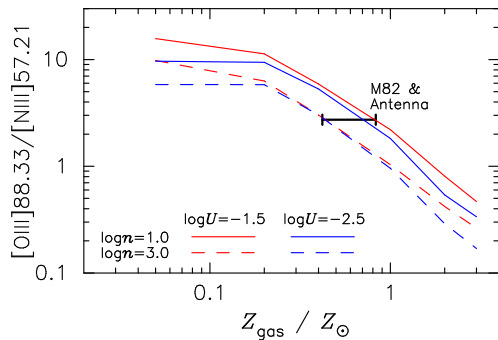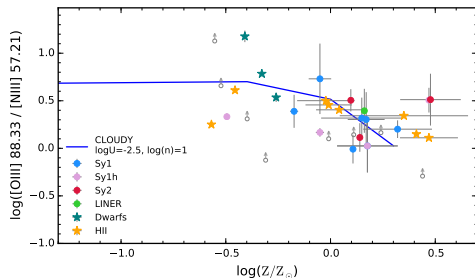Fernández-Ontiveros et al. in prep.

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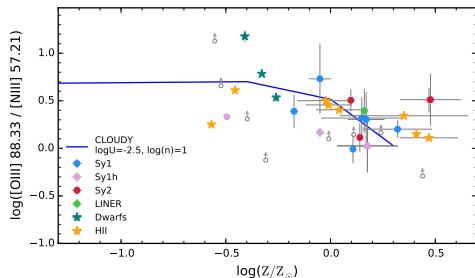- FIR **metallicity** diagnostic **[OIII]/[NIII]**
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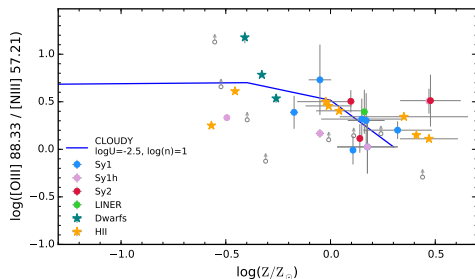 (Nagao+2011)

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- $z > 4.5$ for ALMA $z \lesssim 1.5$ for SPICA

Summary

- **MIR** + **FIR** lines are excellent **diagnostics**

- **Avoid** most of the **extinction**

- Distinguish **AGN/SF/PDR**

- Careful with **strong SF**

- **Local sample** to test diagnostics for high-z studies with ALMA/JWST/SPICA