Exploring the impact of AGN outflows with ALMA and SINFONI

Chiara Circosta (ESO, Germany) and the SUPER team. Email: ccircost@eso.org

Motivation: SUPER aims to quantify the impact of distant AGN on star formation by characterizing ionized outflows and measuring the molecular gas content in their host galaxies, for a representative sample of targets. In this study we characterize the gas properties of AGN, compared to normal star-forming galaxies, in combination with spatially-resolved maps of the outflow and star-forming activity.

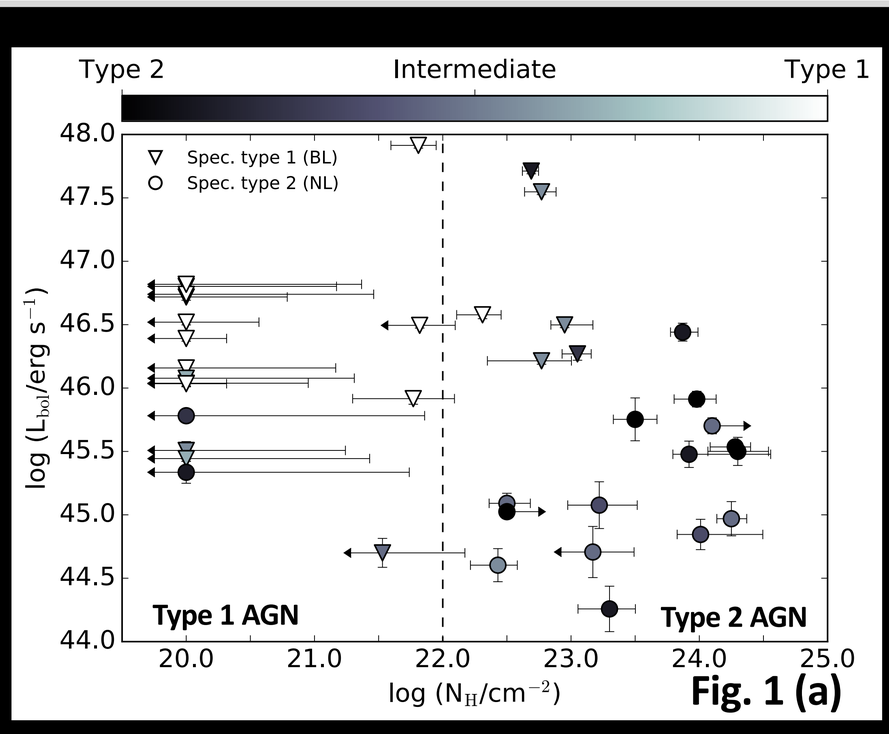

Fig. 1 (a)

SUPER's ID CARD

Name: The SINFONI **S**urvey for **U**nveiling the **P**hysics and **E**ffect of **R**adiative feedback
PI: V. Mainieri
Website: https://www.super-survey.org

Sample selection: 39 X-ray AGN, z_{spec}=[2.0, 2.5], low contamination by telluric lines.

	Ionized outflows & star formation	Molecular gas
Telescope/Instrument:	ESO's VLT/SINFONI (**IFU** data)	ALMA
Observing time:	280 h (Large Programme)	30 h (Cycle 4 & 5)
Specific marks:	**A**daptive **O**ptics facilities	
Resolution:	0.2-0.5'' (**spatially-resolved maps**)	1''
Tracers:	**[OIII]5007**, ionized outflow phase (H-band)	**CO(3-2)** (Band 3)
	Hα, star formation (K-band)	

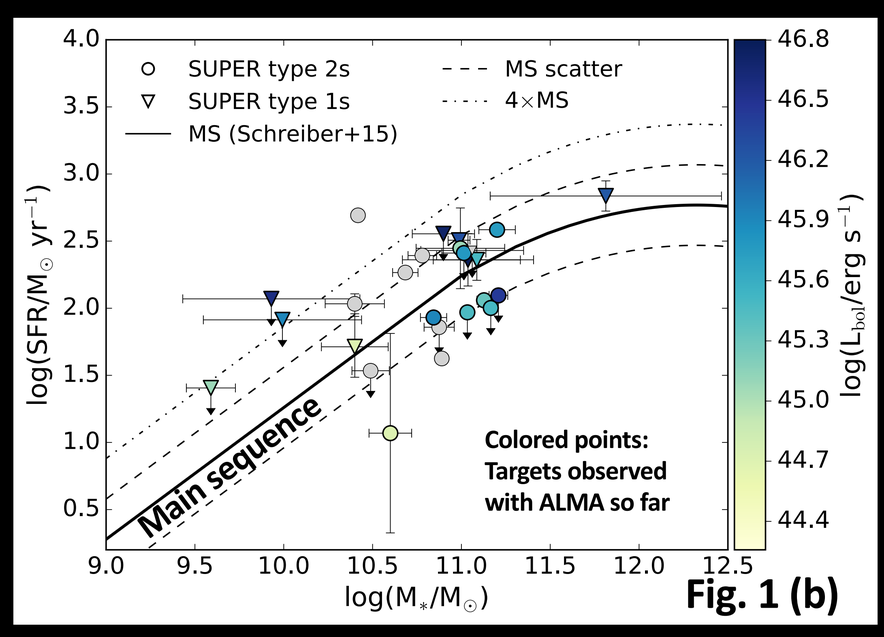

Fig. 1 (b)

SUPER sample properties: the selected AGN sample probes a wide range of AGN bolometric luminosities and obscuring column densities (Fig. 1, a) as well as star formation rates and stellar masses (Fig. 1, b). The sample selection is unbiased with respect to the presence of outflows (Circosta+18, A&A, in press).

The molecular gas content of z∼2 AGN

Overall, our targets have lower molecular gas contents compared to normal star-forming (SF) galaxies (see, e.g., Brusa+18, Perna+18, Kakkad+17), as shown in Fig. 2 (a and b). We will investigate the gas kinematics ([OIII] and Hα) as a function of gas fraction, to search for evidence of feedback (positive, negative) and/or effects of AGN emission on the status of the molecular gas. An example of our future analysis is presented in Fig. 3.

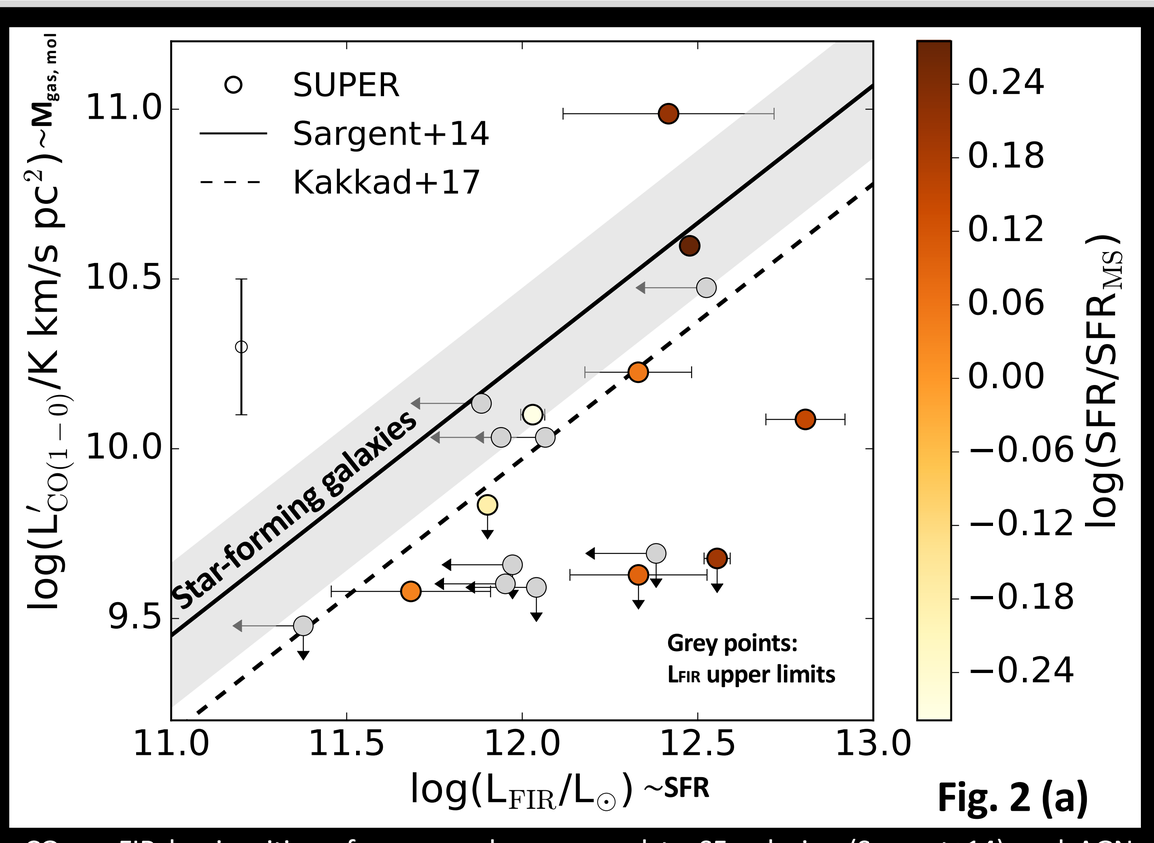

Fig. 2 (a)

CO vs. FIR luminosities of our sample compared to SF galaxies (Sargent+14) and AGN (Kakkad+17). The SUPER targets, mainly lying on the main sequence (see color bar), show lower gas contents compared to SF galaxies (Circosta et al., in prep.).

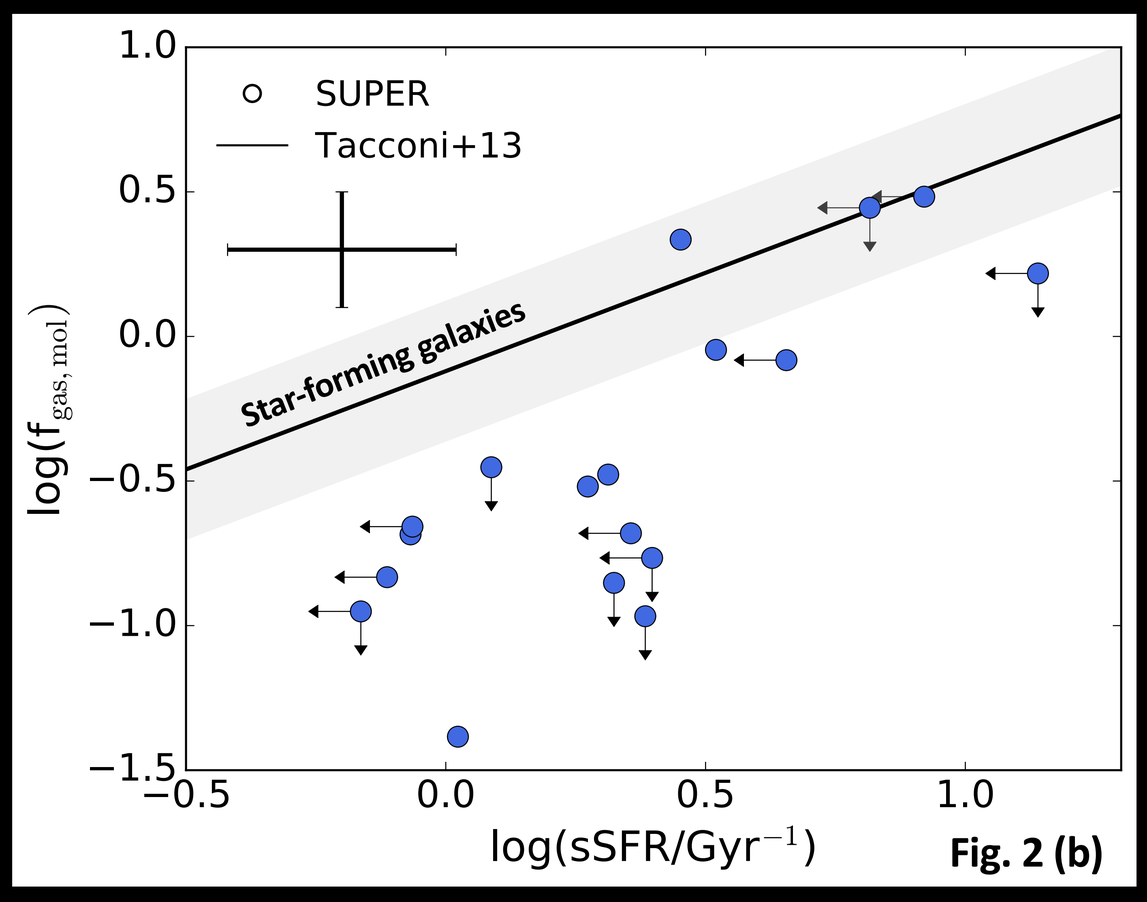

Fig. 2 (b)

Molecular gas fractions ($M_{gas,mol}/M_*$) vs. specific star formation rates (SFR/M_*) of our sample compared to SF galaxies (Tacconi+13). The SUPER targets show, overall, lower gas fractions (Circosta et al., in prep.).

Future work

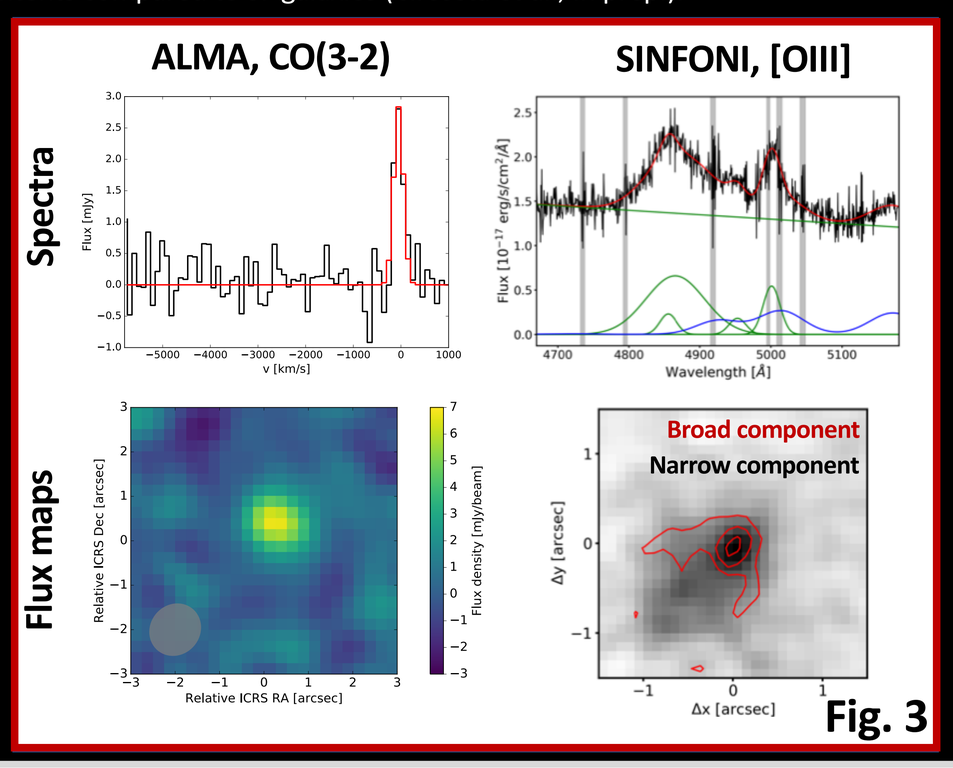

Fig. 3

References: Brusa M., et al., 2018, A&A, 612, 29; Perna M., et al., 2018, arXiv:180703378P; Kakkad D., et al., 2017, MNRAS, 468, 4205; Sargent M. T., et al., 2014, ApJ, 793, 19; Tacconi L. J., et al., 2013, ApJ, 768, 74.