The SINFONI, MUSE, and ALMA View of NGC 5728

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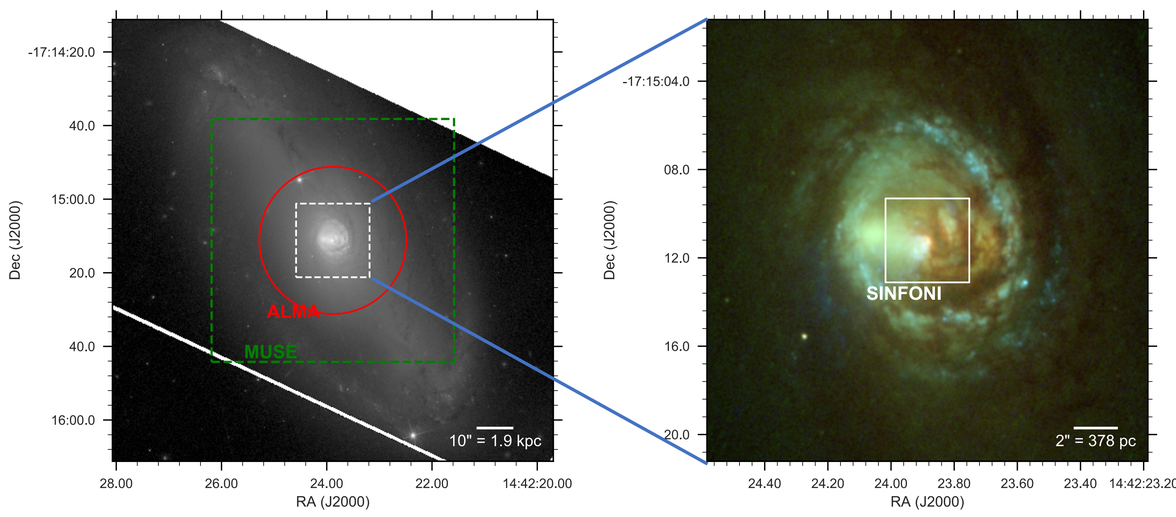
Introduction

- NGC 5728 is a nearby (D = 39 Mpc) barred spiral galaxy containing a powerful AGN (L_{Bol} ~10^{45} ergs/s)
- Provides an ideal laboratory for testing the effects of AGN feedback on the host galaxy
- Using archival MUSE and ALMA observations, we probe the distribution of molecular and ionized gas on kpc scales
- SINFONI data from the LLAMA program (see Davies poster 1I) probes the inner few 100 pc

Shimizu et al in prep

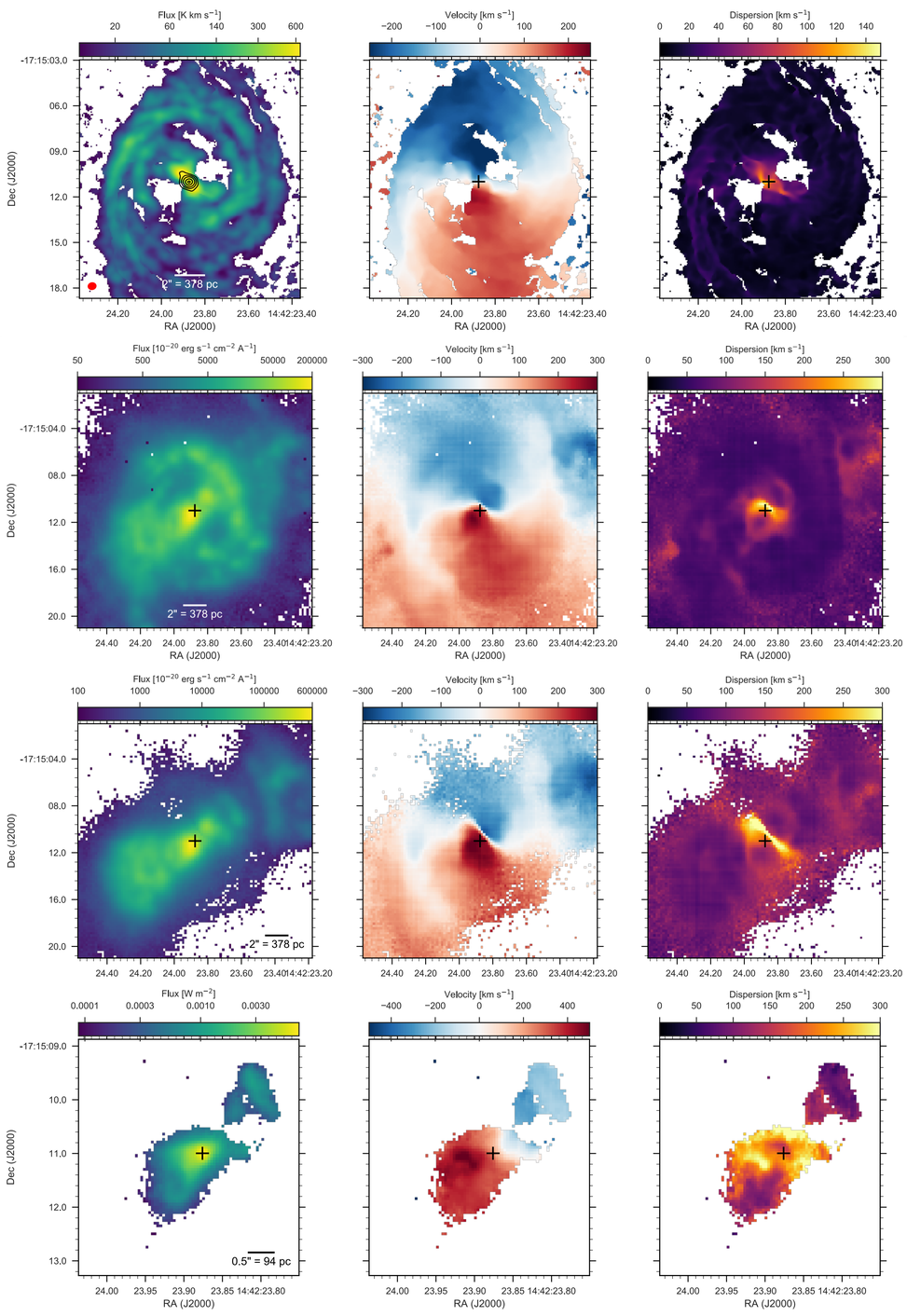


CO 2-1

Hα

[OIII]

[SiVI]

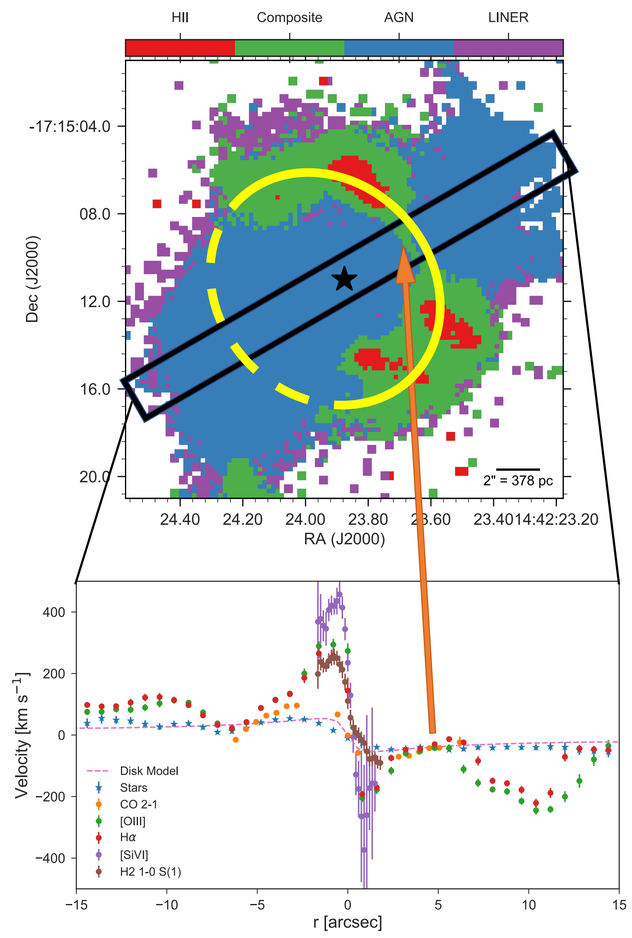


Analysis

- All emission lines fit with a single Gaussian to measure l.o.s. flux, velocity, and velocity dispersion
- Both CO 2-1 and Hα trace a circumnuclear, rotating ring
- [OIII] shows a clear bi-conical structure extending to 1 kpc
- Kinematics of the ionized gas also show a strong nuclear outflow
- Spatially resolved BPT diagram indicates majority of gas photoionized by AGN in NLR while the ring is dominated by star formation
- Line ratios map position of the bicone in front of the ring on the far side and behind on the near side
- [SII] doublet ratio allows for measurement of electron density:

$N_{e,outflow}$ ~700 cm^{-3}

$N_{e,ring}$ ~100 cm^{-3}



1D velocity profile along the bicone for multiple tracers of the gas and stars. The outflow decelerates down to the disk velocity after ~500 pc.

Results

- 2D kinematic modeling of disk (CO 2-1) and outflow ([SiVI]) well reproduces velocity structure
- Gas flow entering cone ~300 $M_\odot$/yr
- Mass outflow rate only ~5 $M_\odot$/yr
- AGN outflow does not seem to be strongly disrupting the disk
- Holes in molecular disk likely highly heated gas that reduces low-J transitions of CO although model residuals indicate possible low velocity molecular outflow