

Testing the new emerging unification paradigm of active galactic nuclei with JWST/MIRI

Daniel Asmus

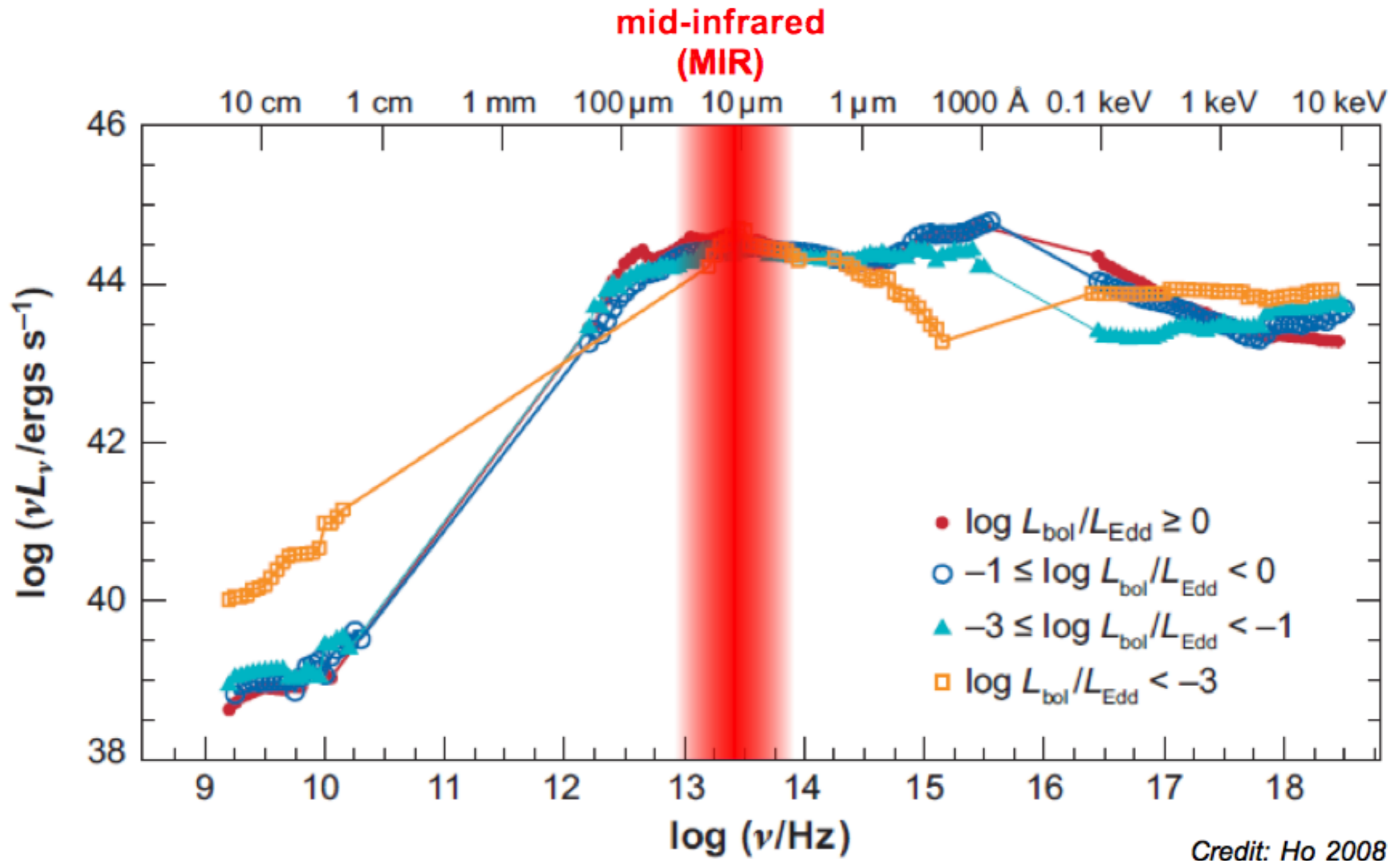
ESO, Chile

with

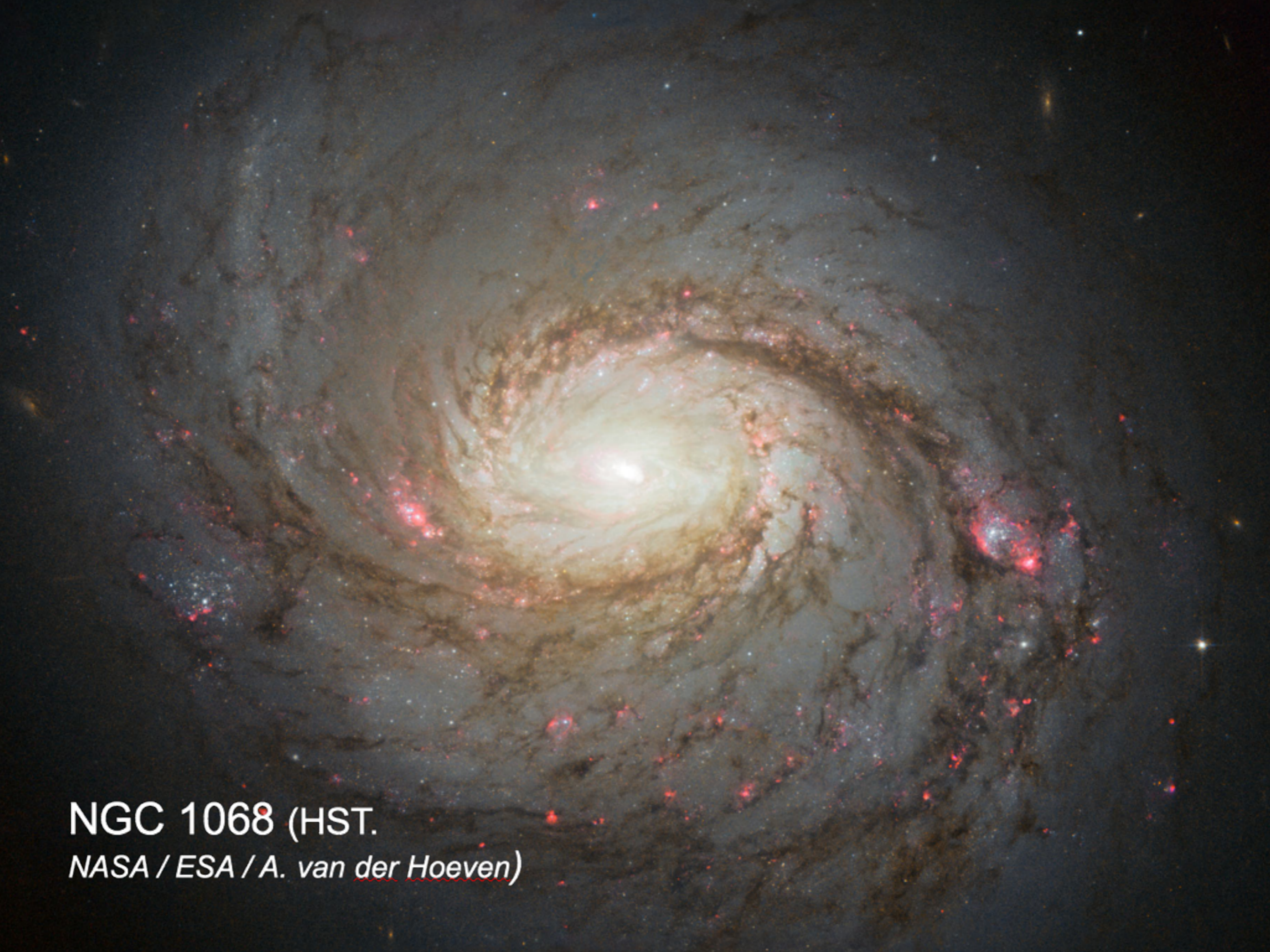
Sebastian Hönig & Poshak Gandhi



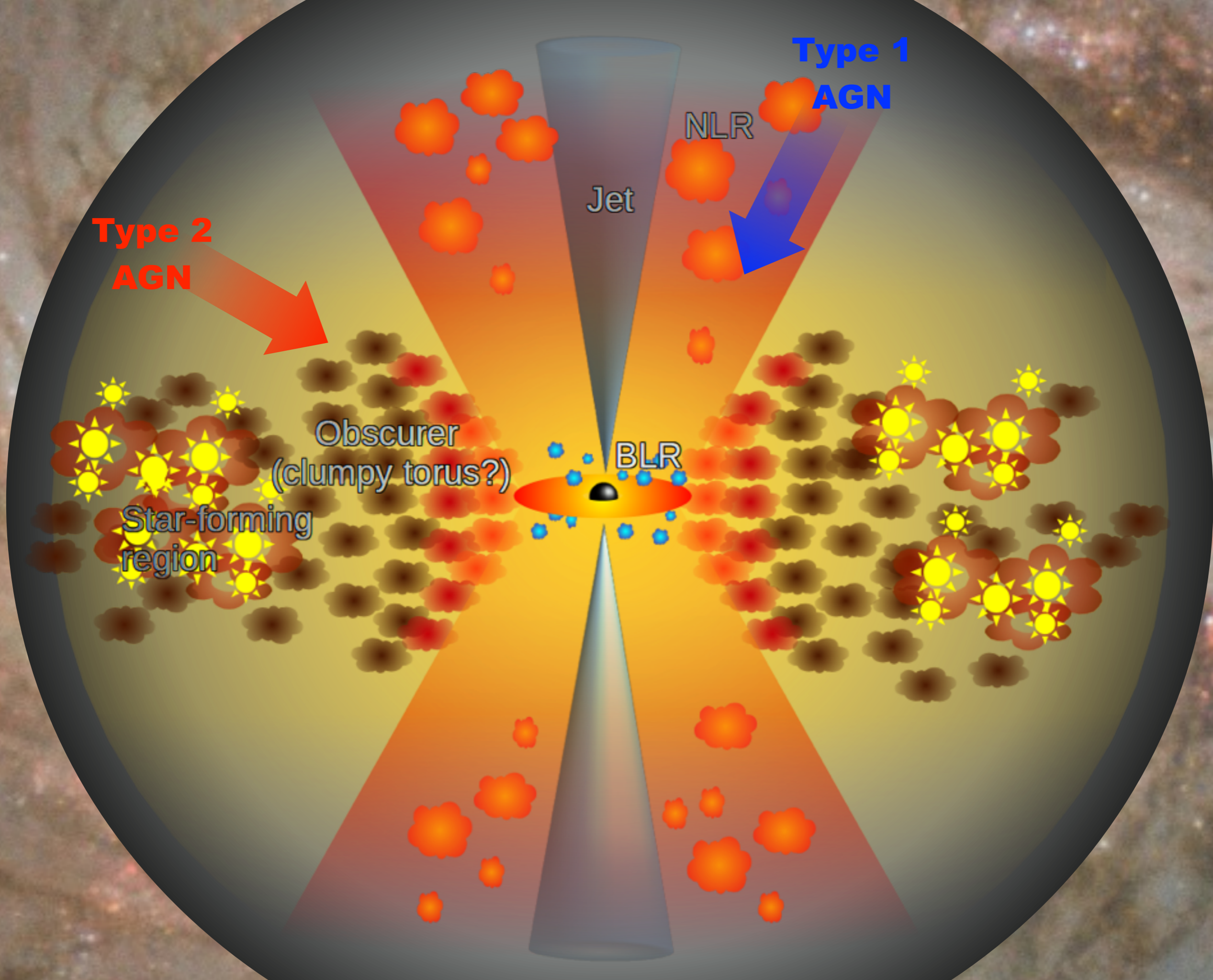
AGN are bright(est) in the mid-infrared.

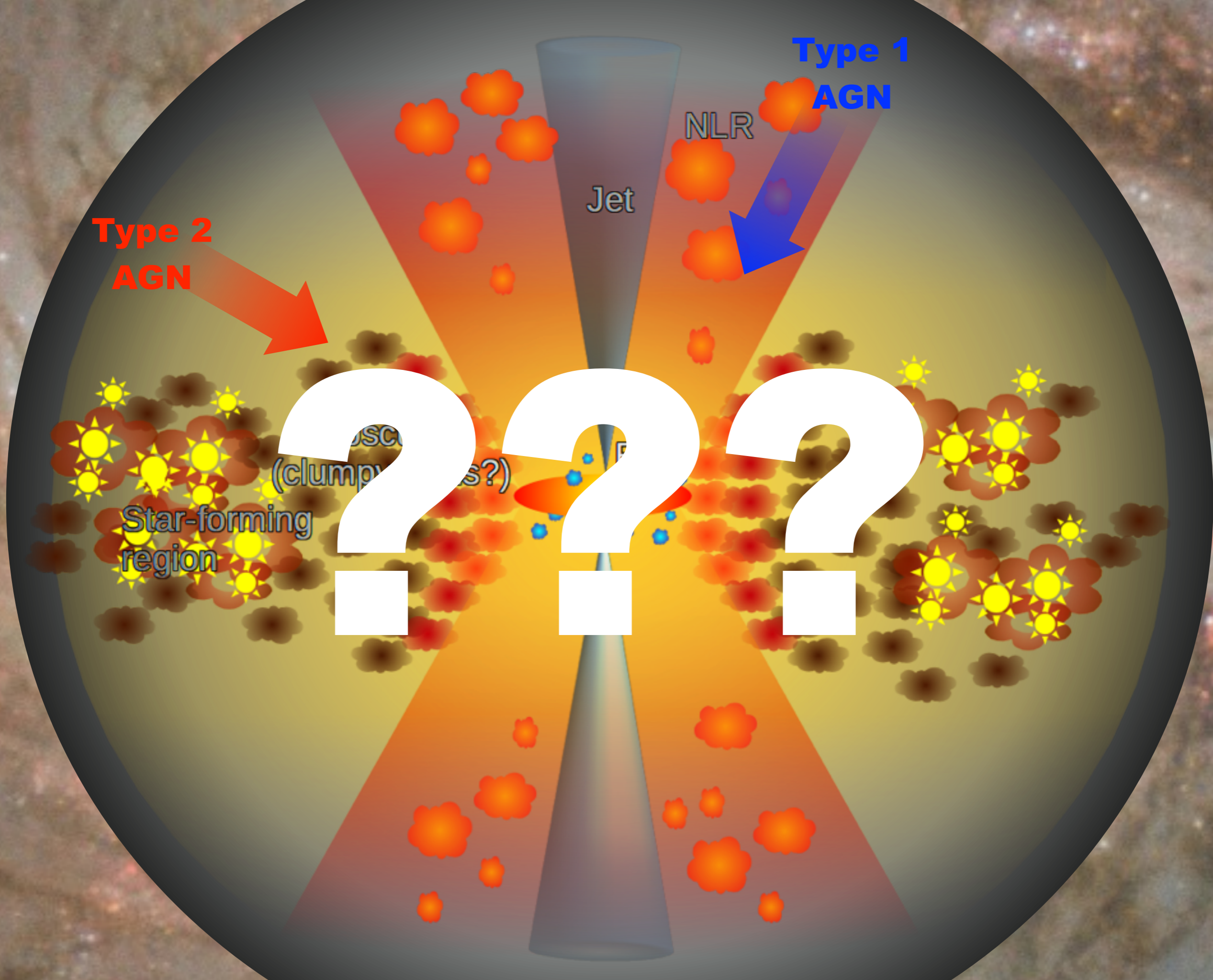


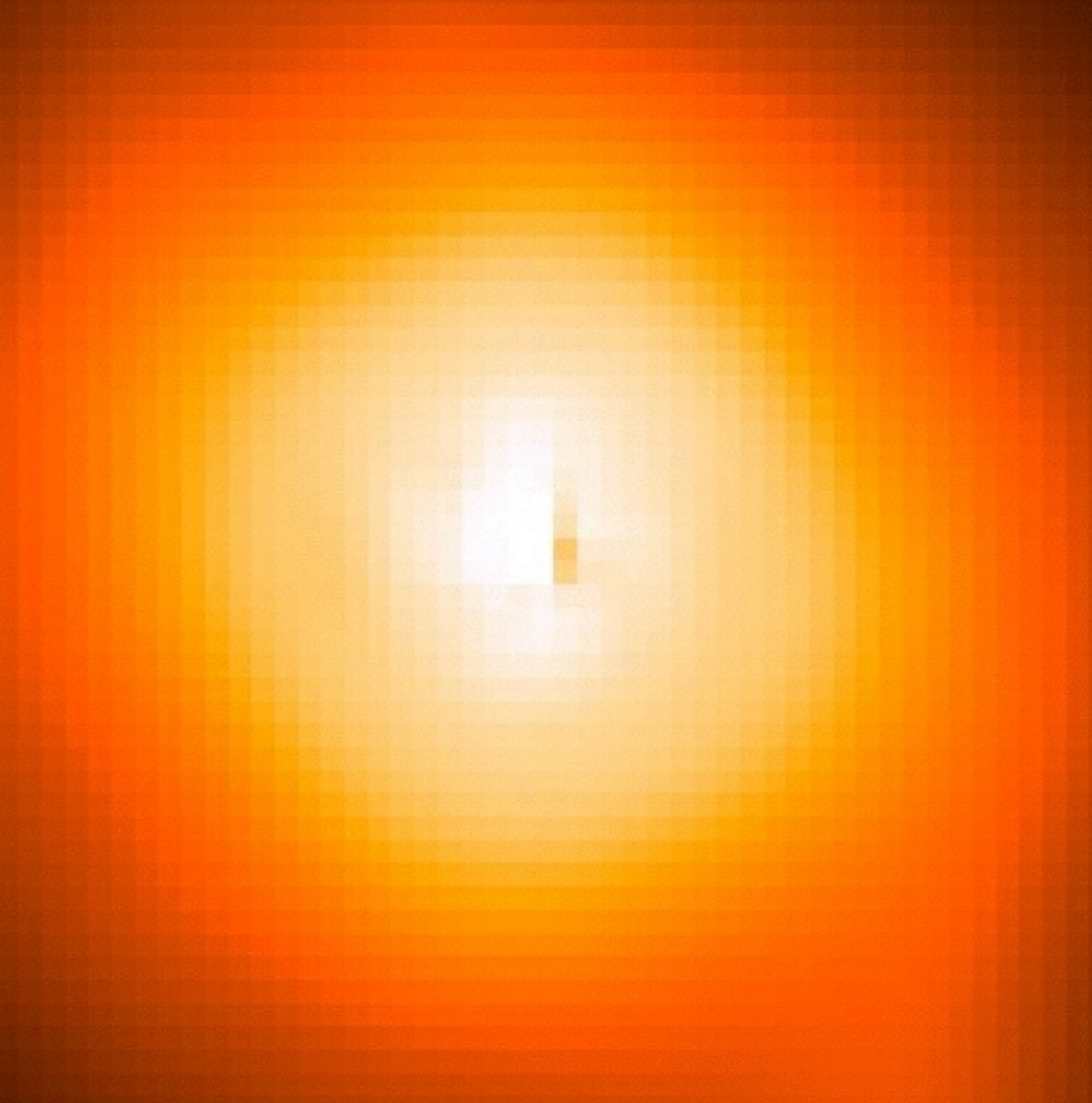
Credit: Ho 2008



NGC 1068 (HST.
NASA / ESA / A. van der Hoeven)



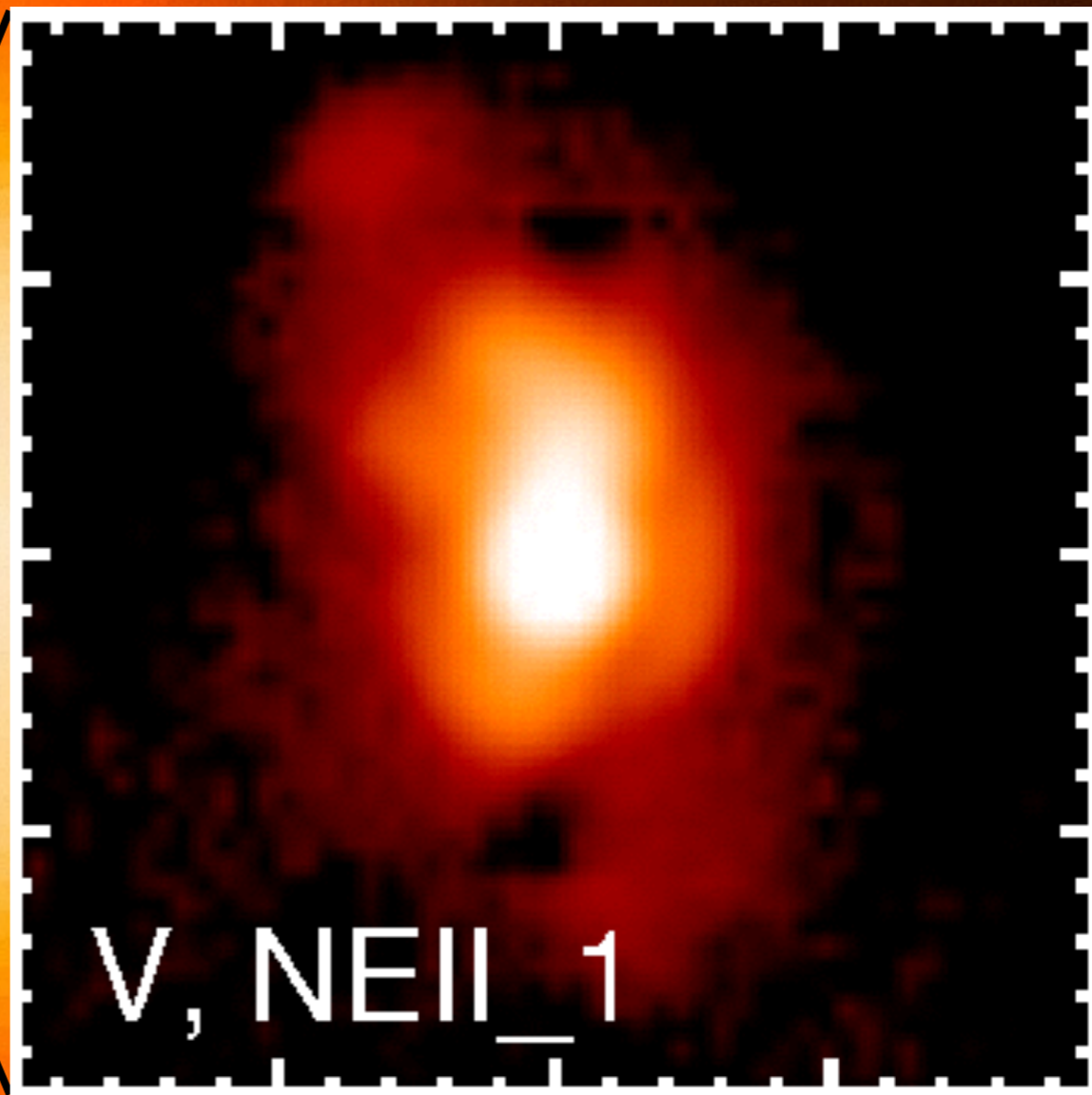




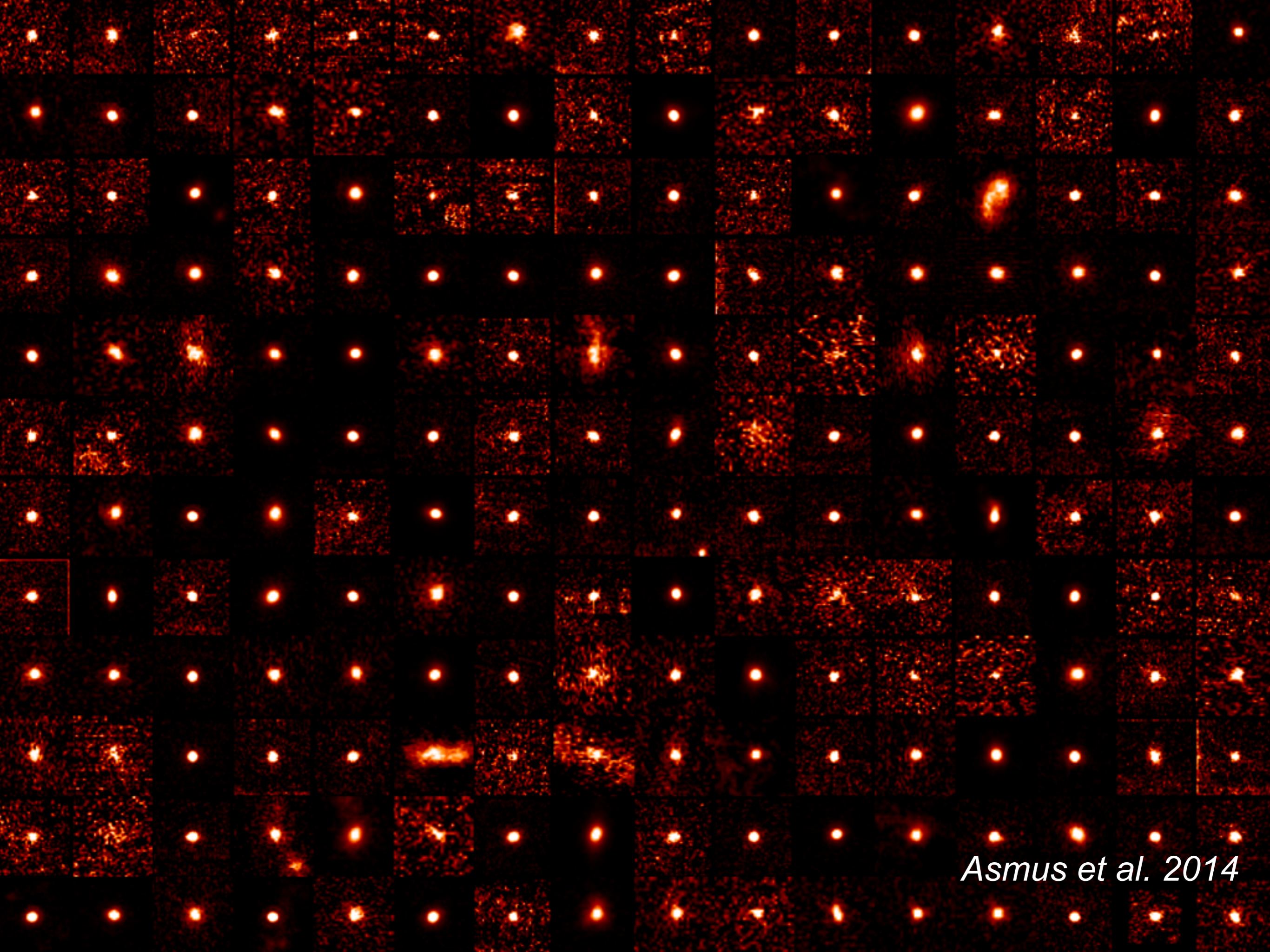
WISE (0.4m)

WISE (0.4m)

4''

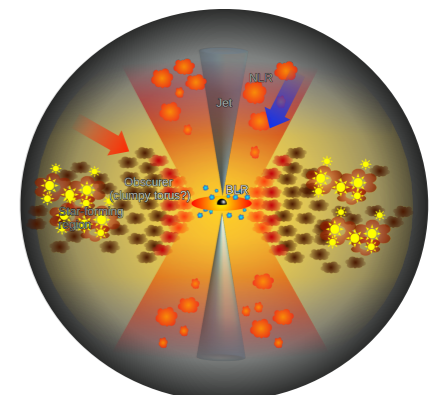
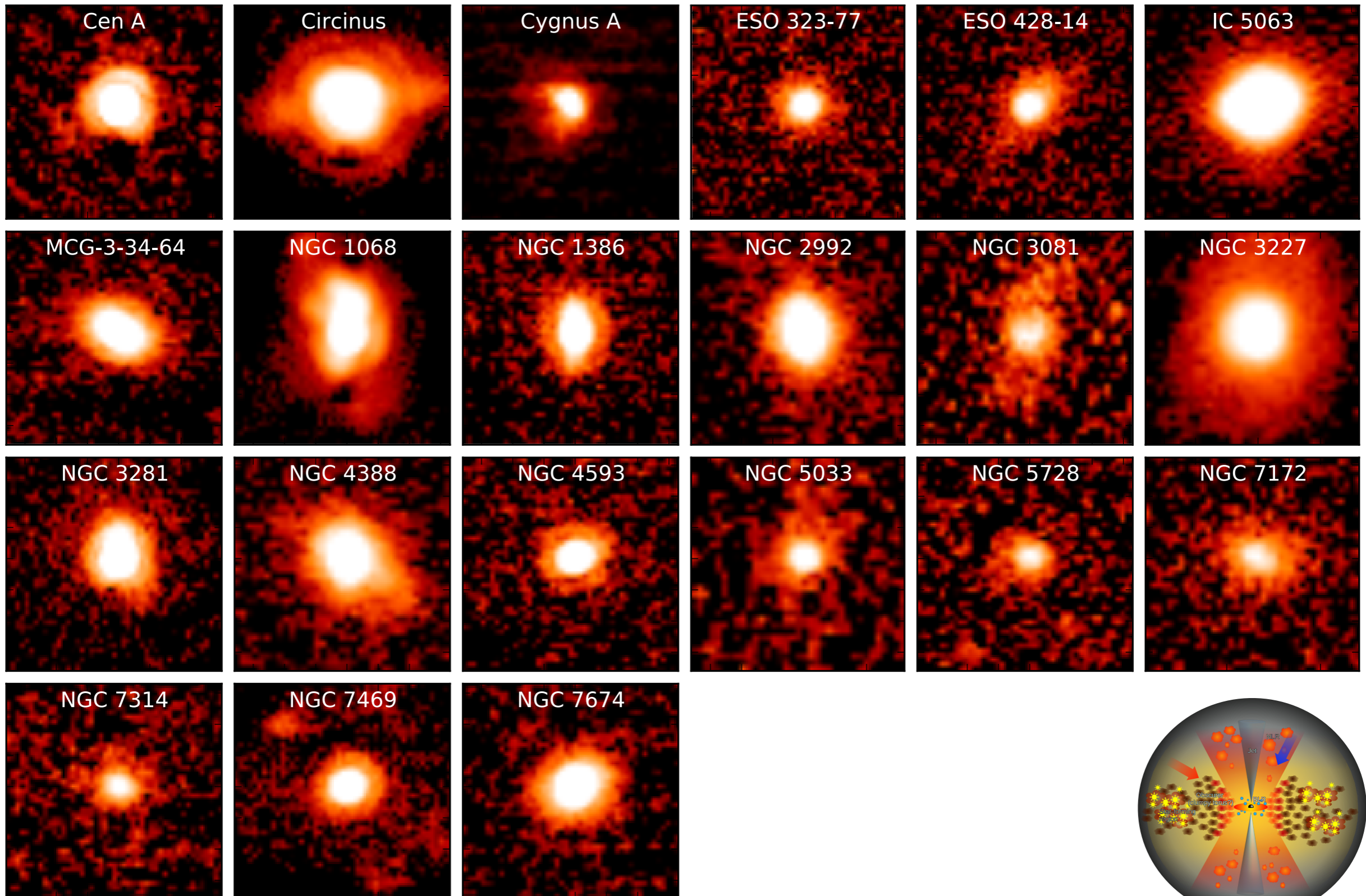


VLT/VISIR (8.2m)

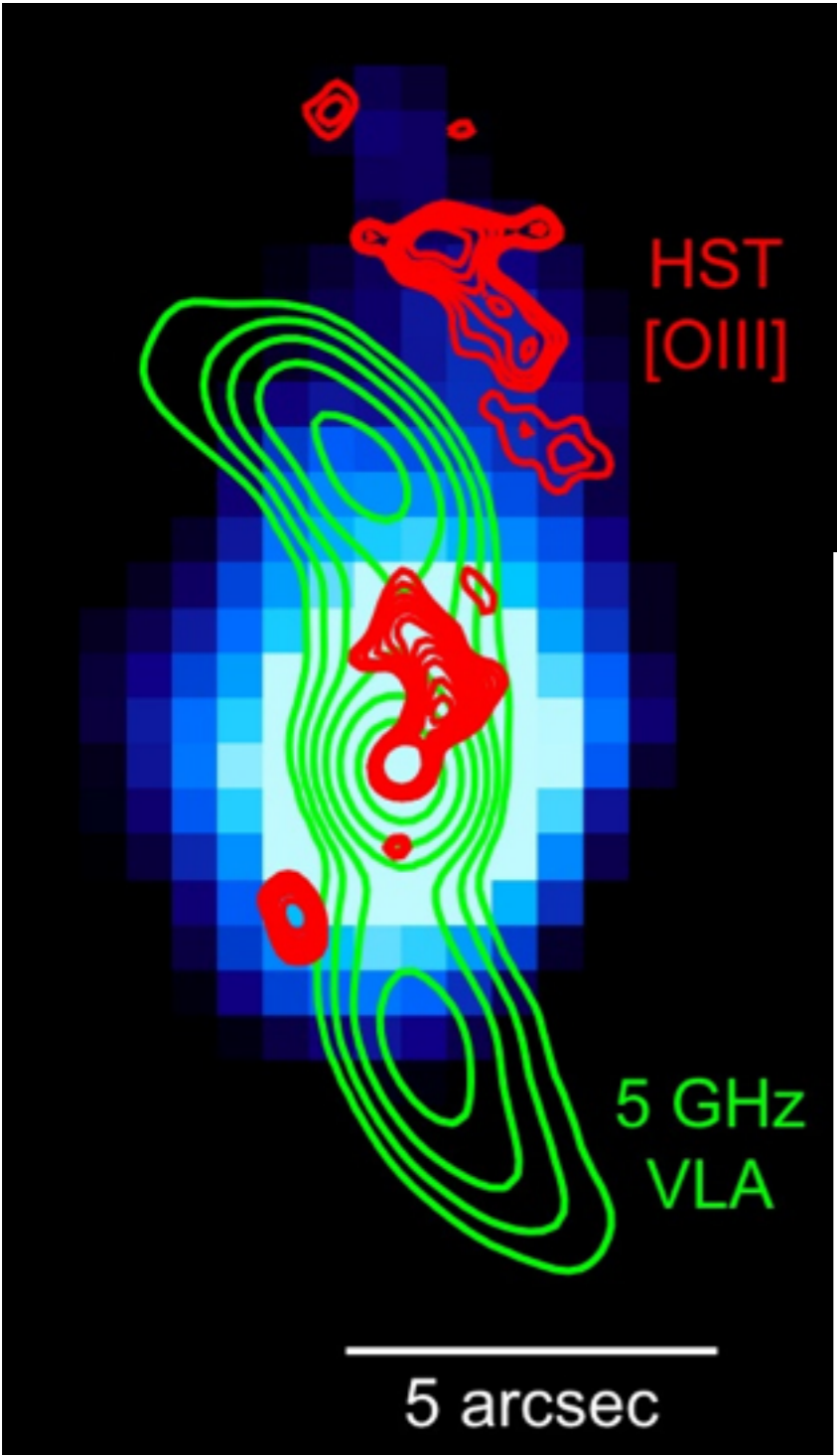


Asmus et al. 2014

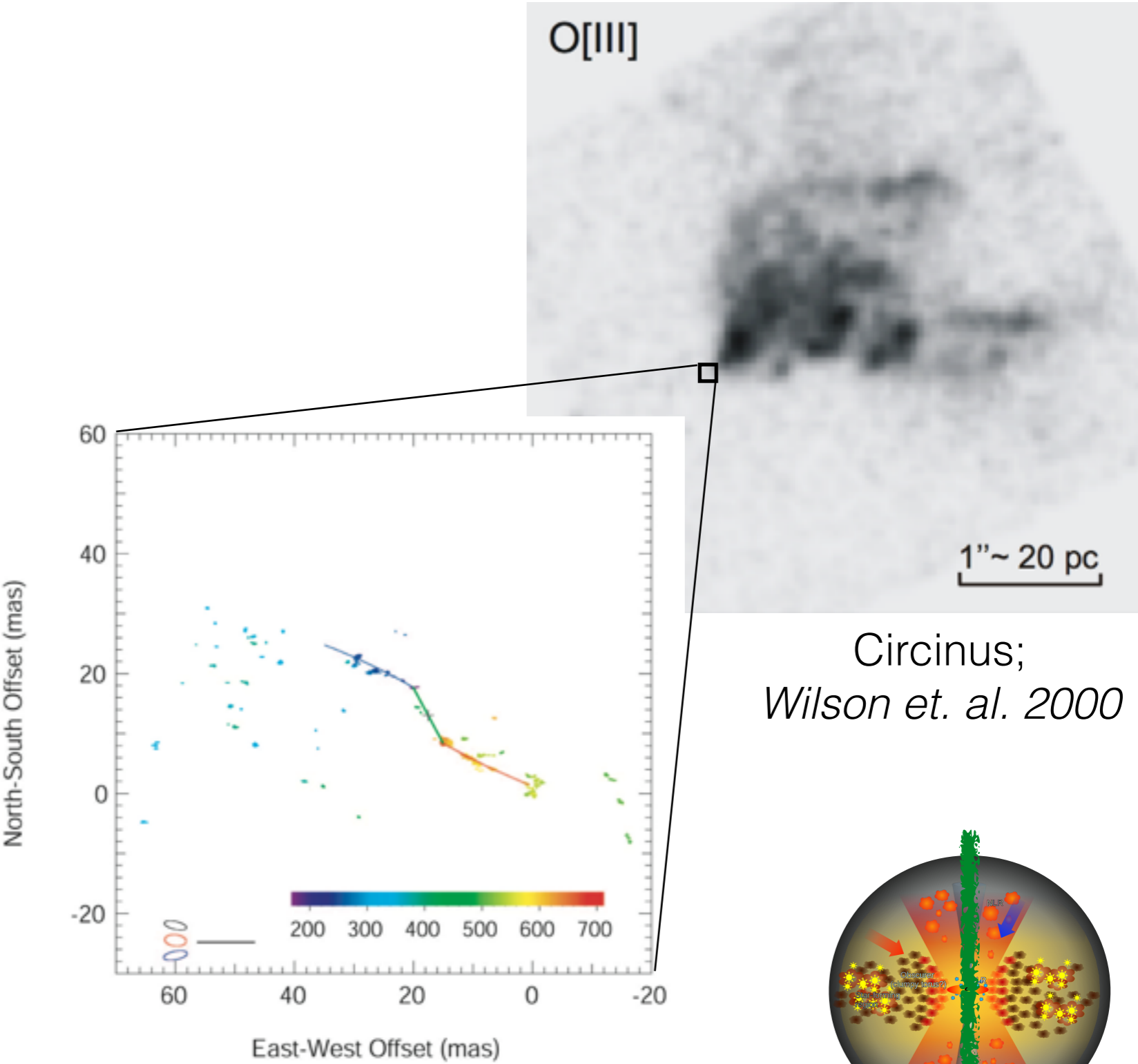
Only few without strong star formation are resolved (~10-100pc) Is the resolved emission coming from the torus?



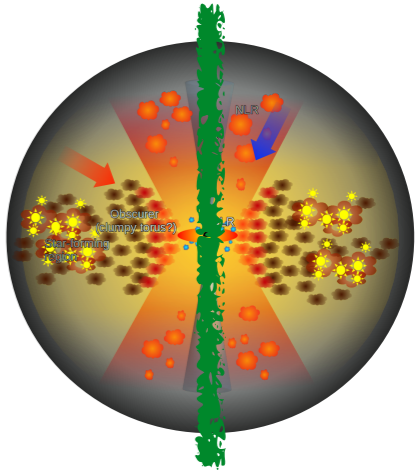
Establishing a system axis from ionisation cones [OIII], radio jets, maser disks, and polarized emission.



NGC 2110; *credit: D. Evans*

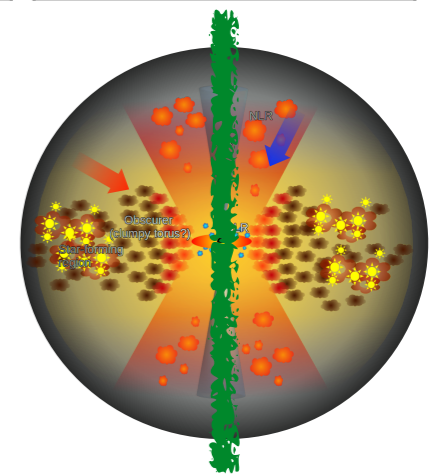
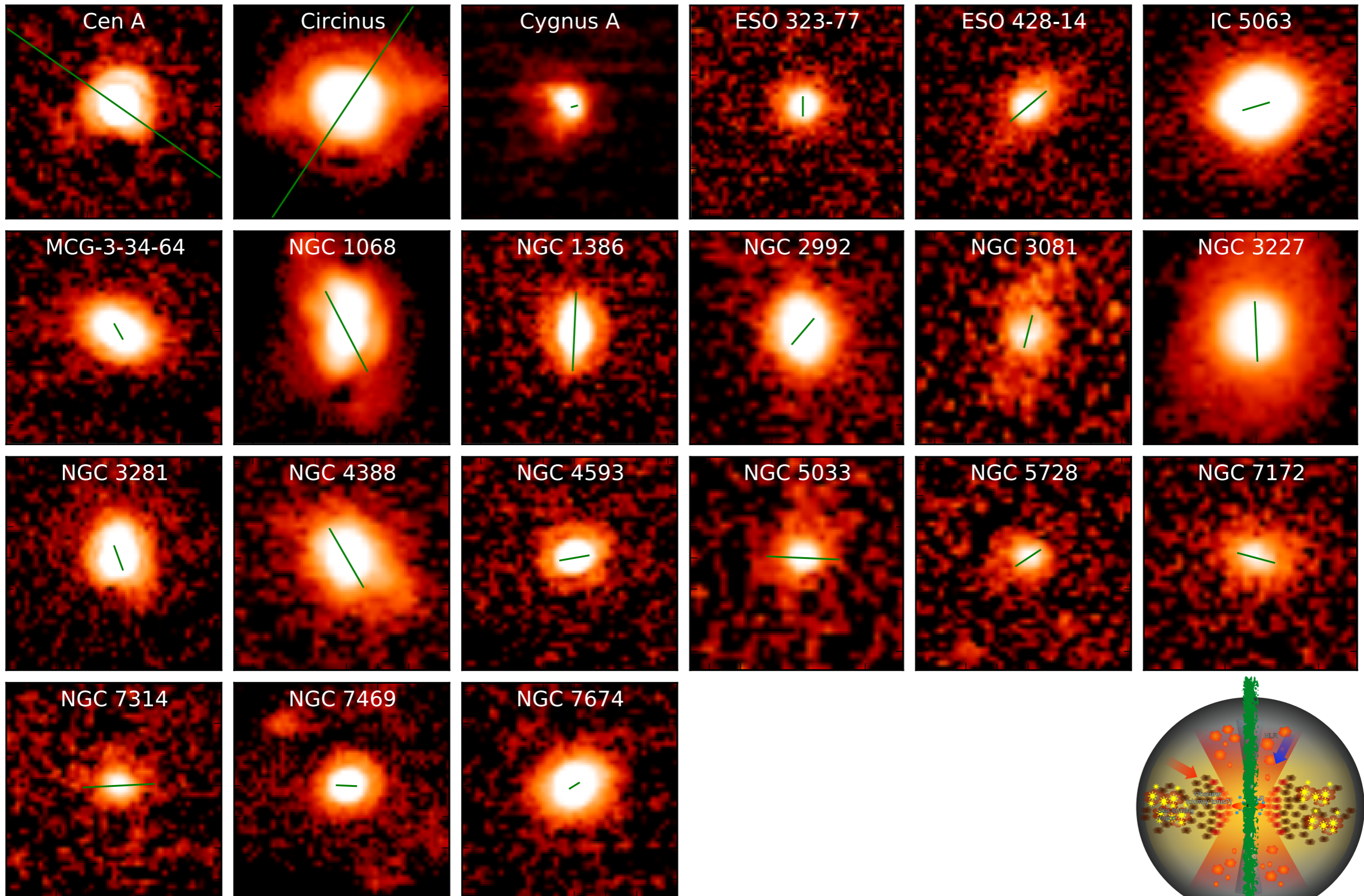


Circinus;
Wilson et. al. 2000

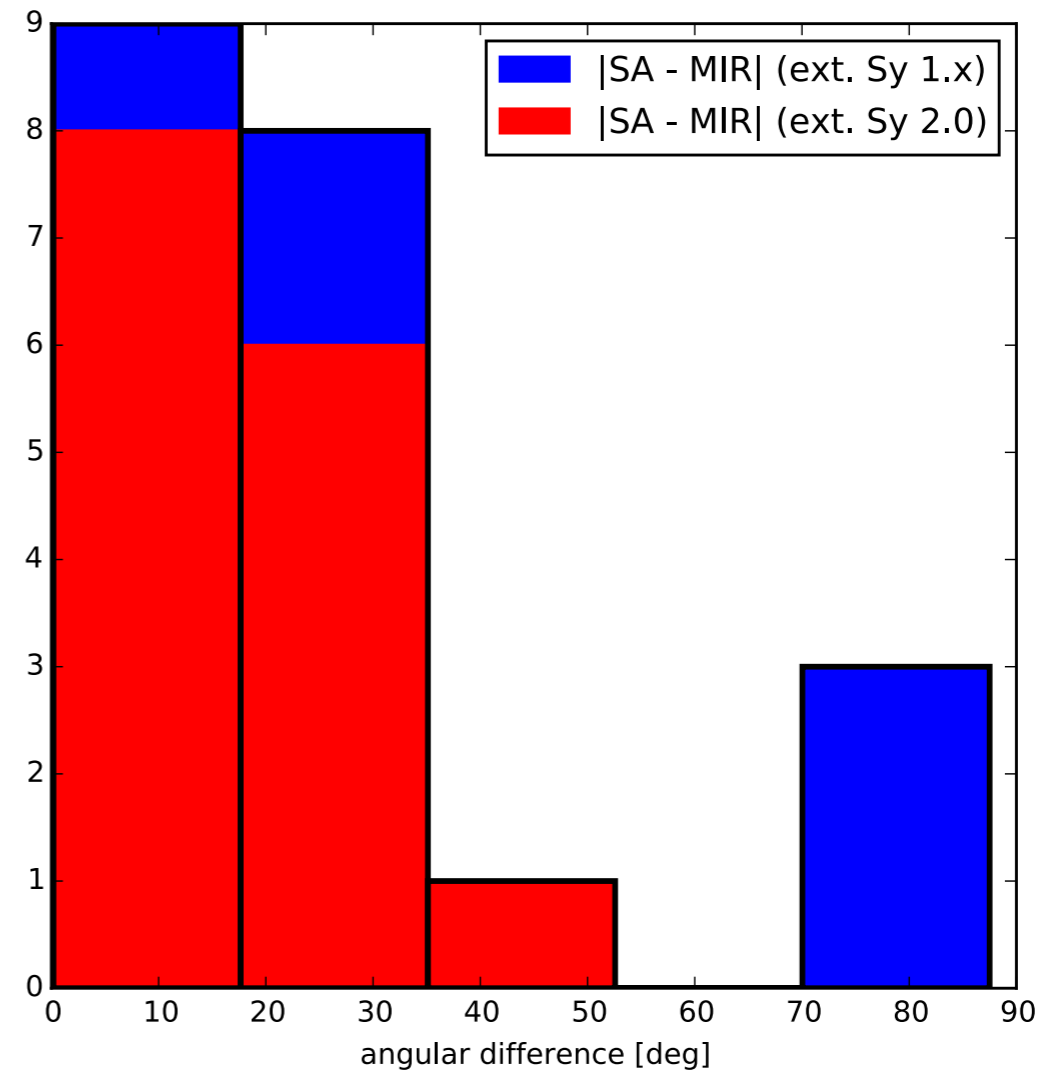
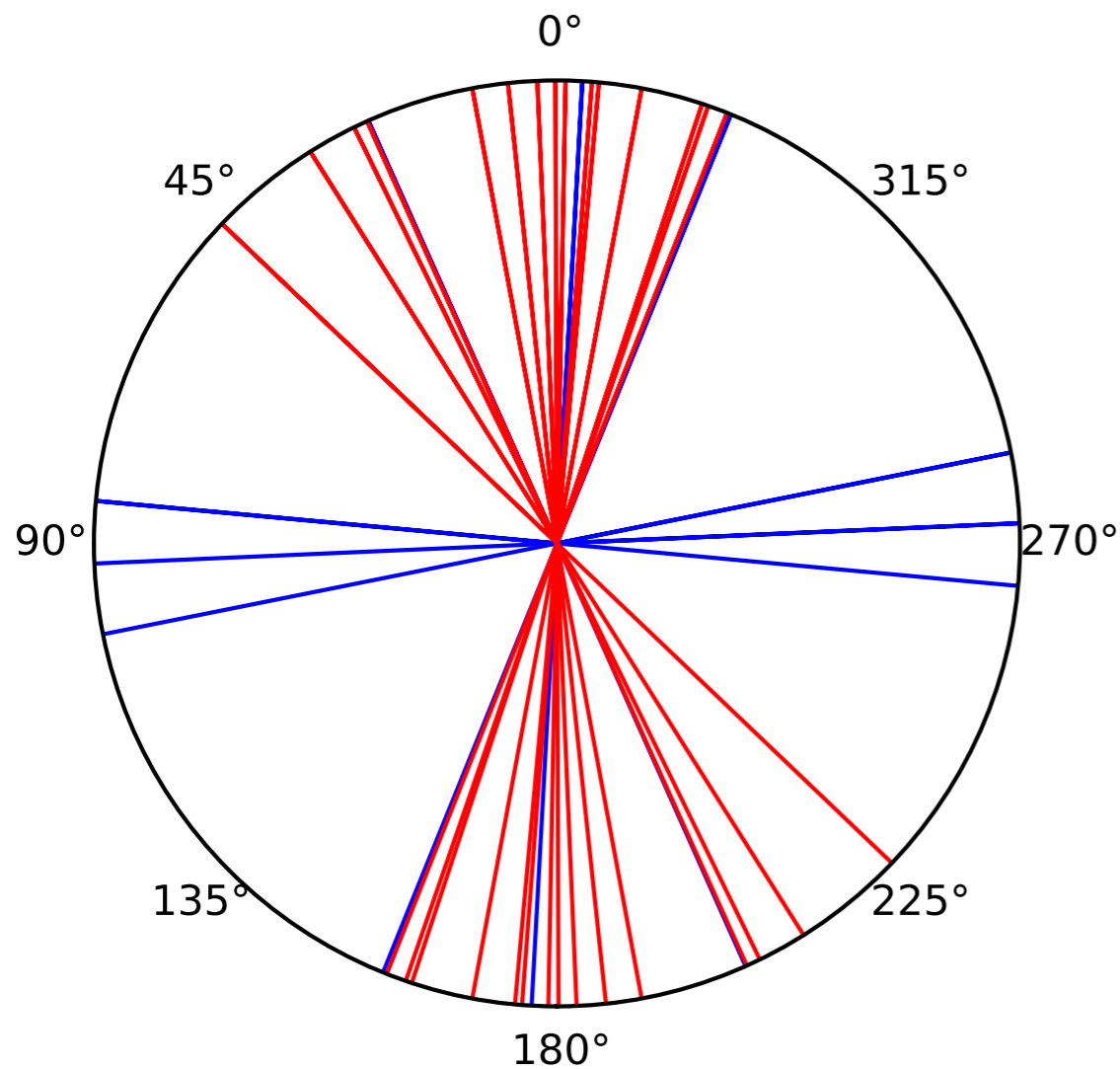


Circinus; *Greenhill et al. 2003*

Only few without strong star formation are resolved ($\sim 10\text{-}100\text{pc}$) Is the resolved emission coming from the torus?



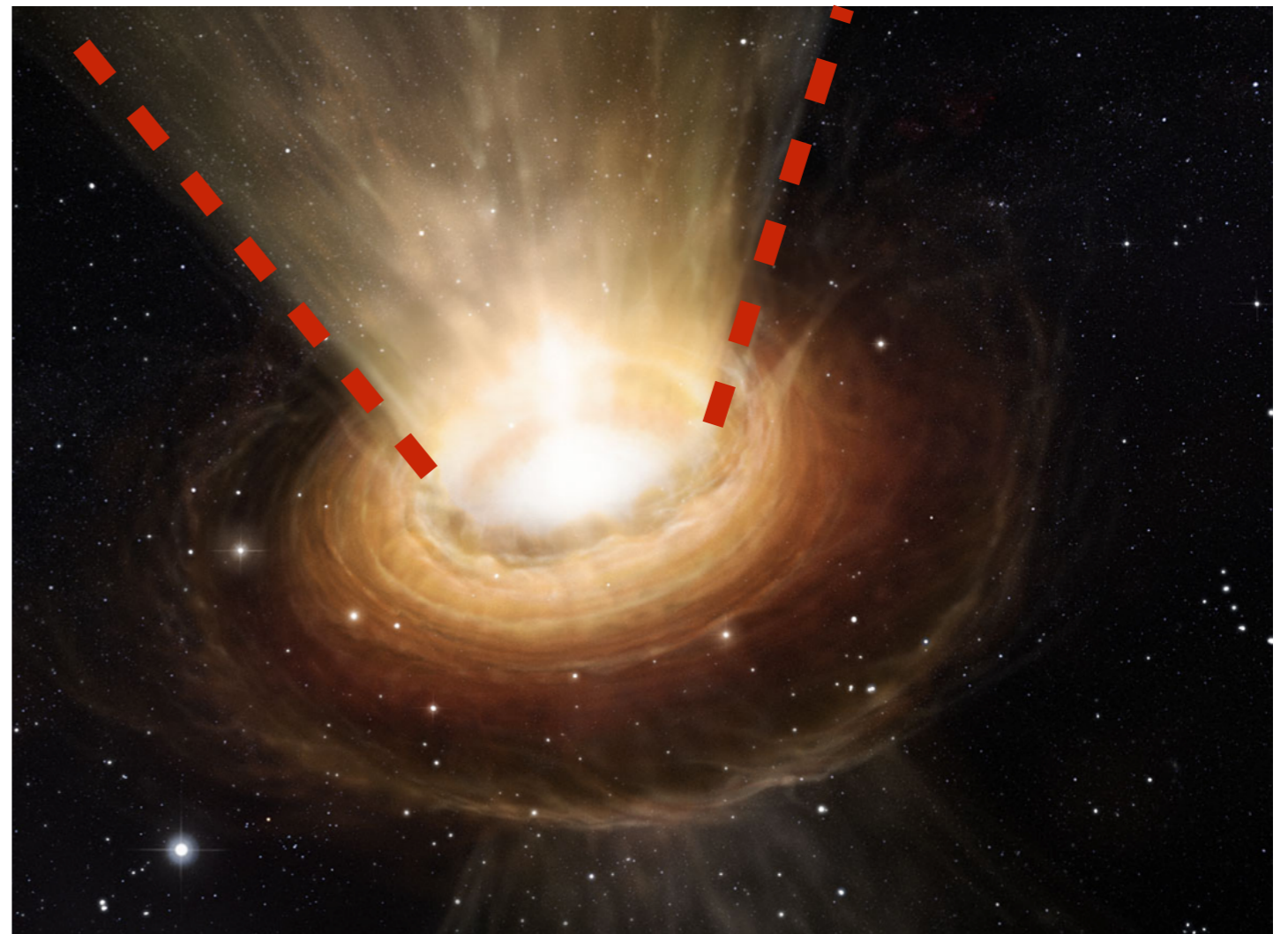
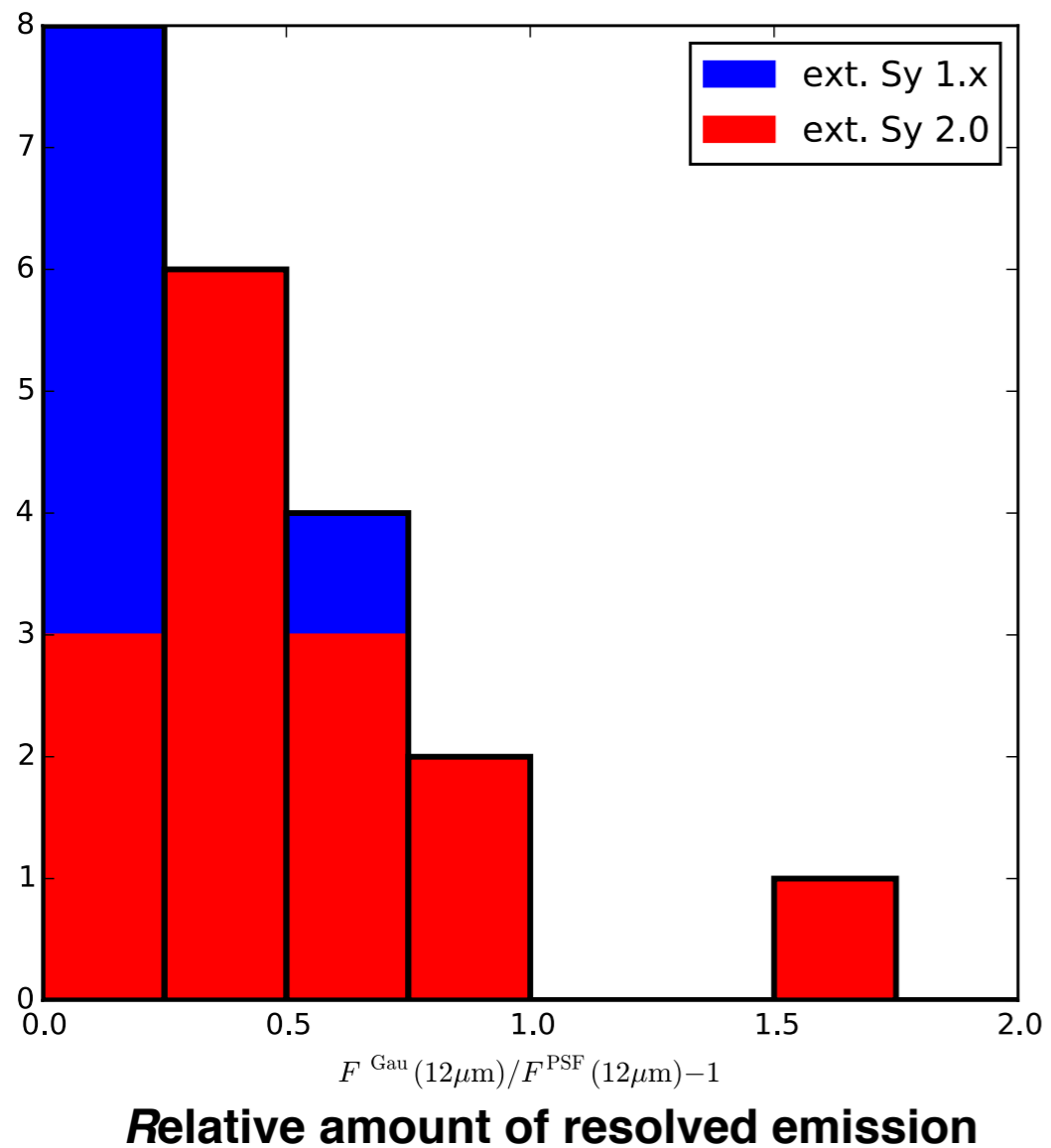
The resolved emission is coming from the polar axis of the AGN systems!



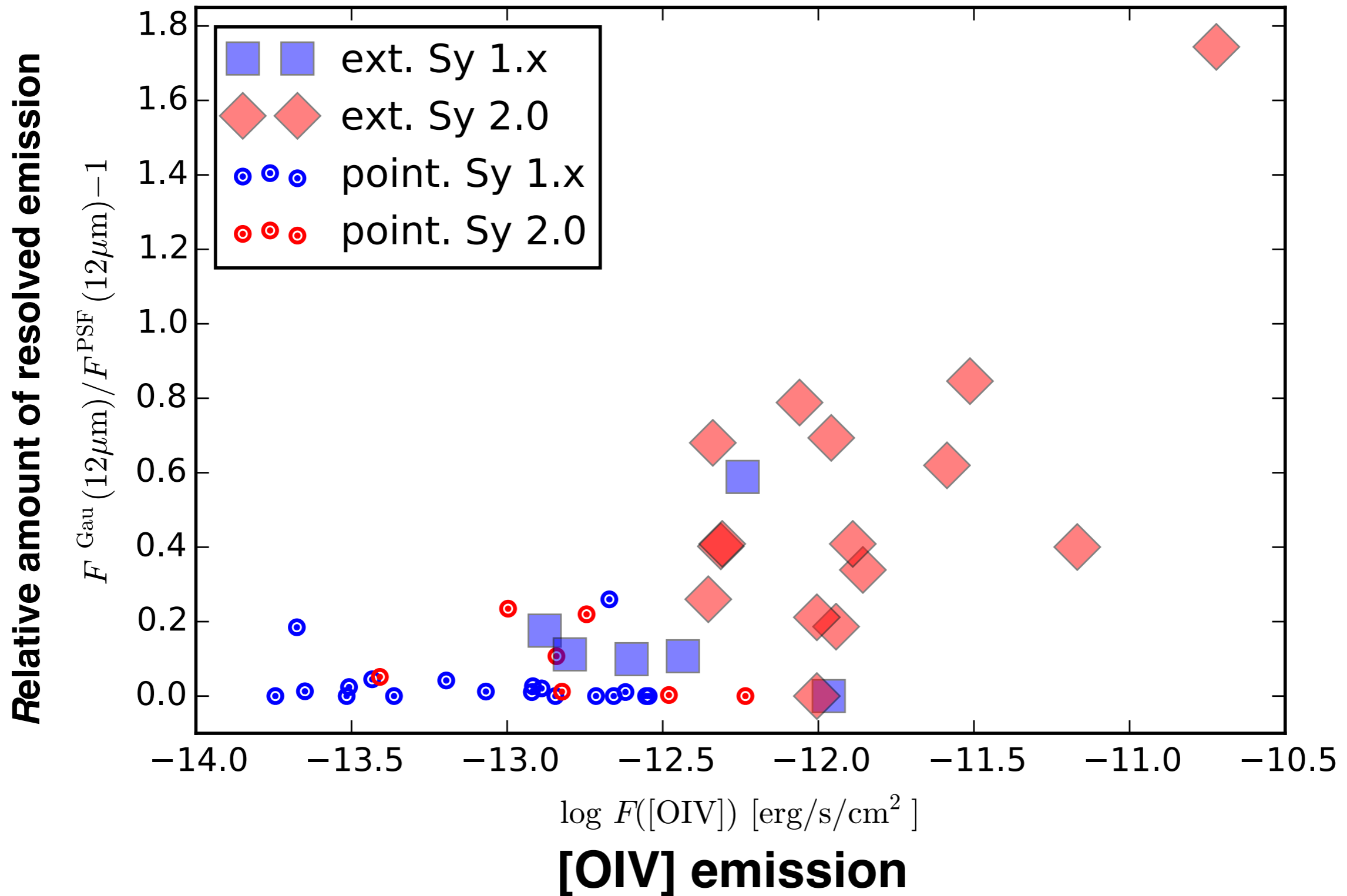
Angular difference (System Axis - MIR extension)

Asmus et al. 2016 (see also Braatz et al. 1993; Cameron et al. 1993; Bock et al. 2000; Radomski et al. 2002, 2003; Whyson & Antonucci 2004; Packham et al. 2005; Reunanen, Prieto & Siebenmorgen 2010; Hönig et al. 2010)

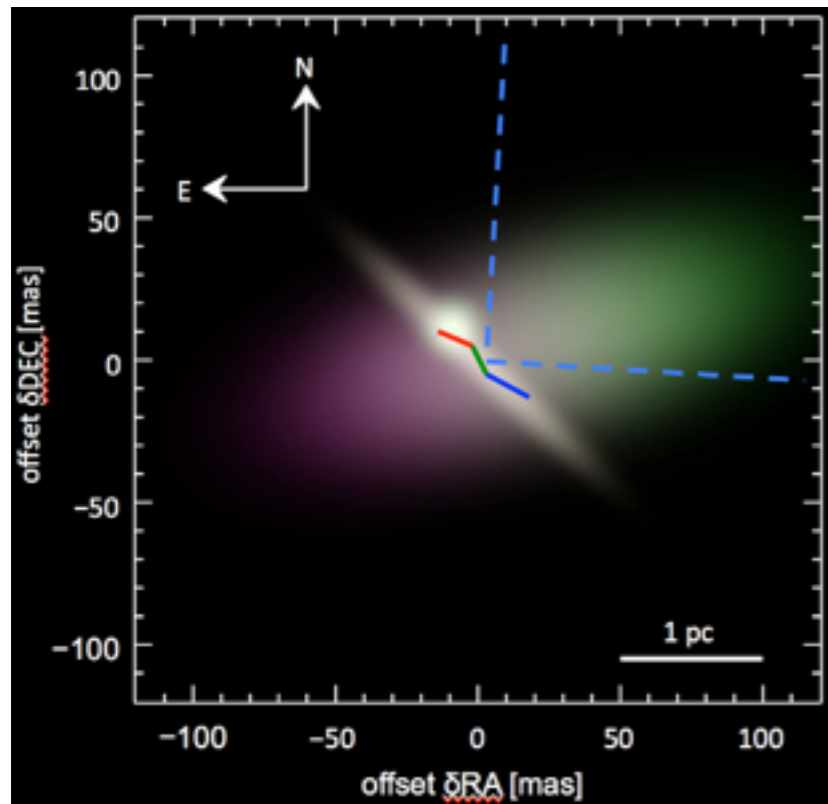
Is the mid-infrared emission of AGN dominated by dust in/along the ionisation cone instead of the obscuring torus?



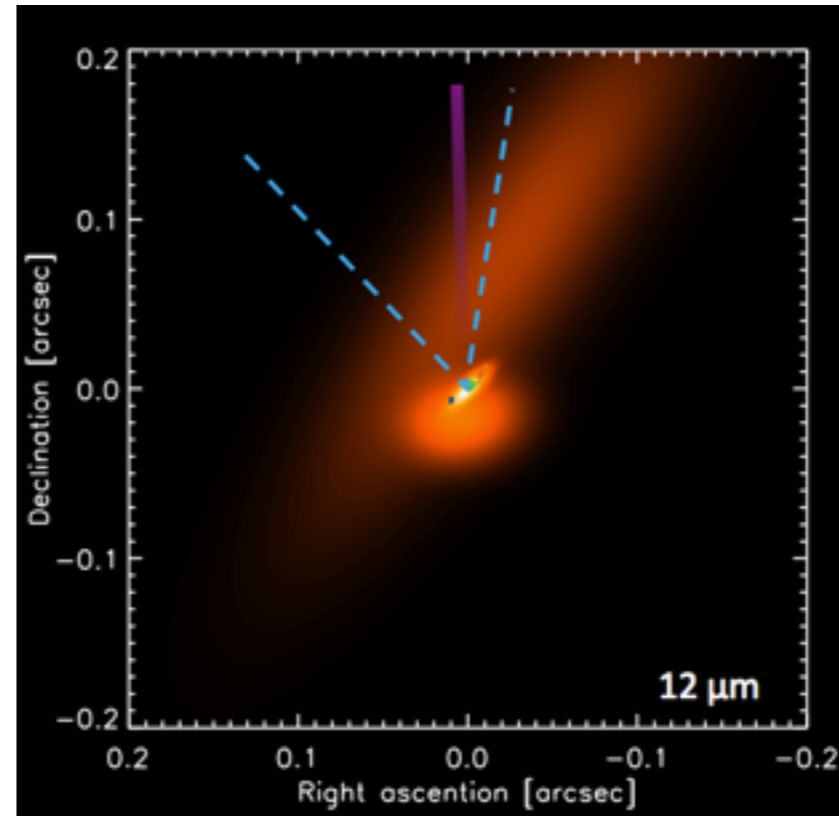
The resolved emission strongly correlates with the [OIV] emission produced in the ionisation cone



Polar elongation is dominant also on parsec scale as found with MIDI interferometry (Lopez-Gonzaga et al. 2016)

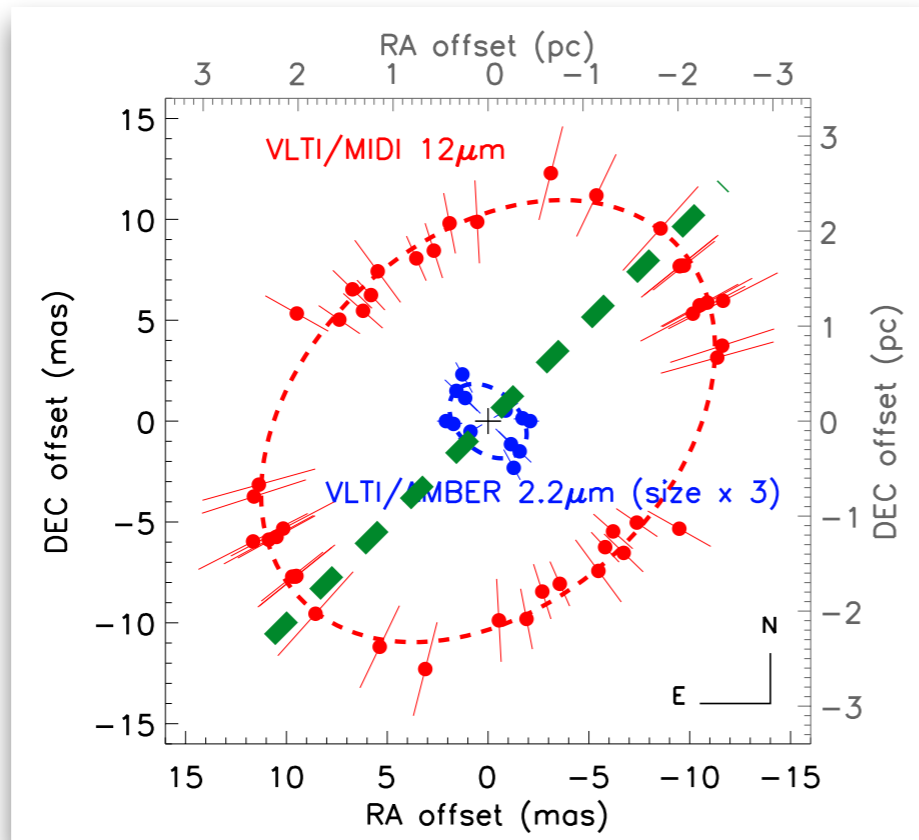


Circinus;
Tristram et al. 2014

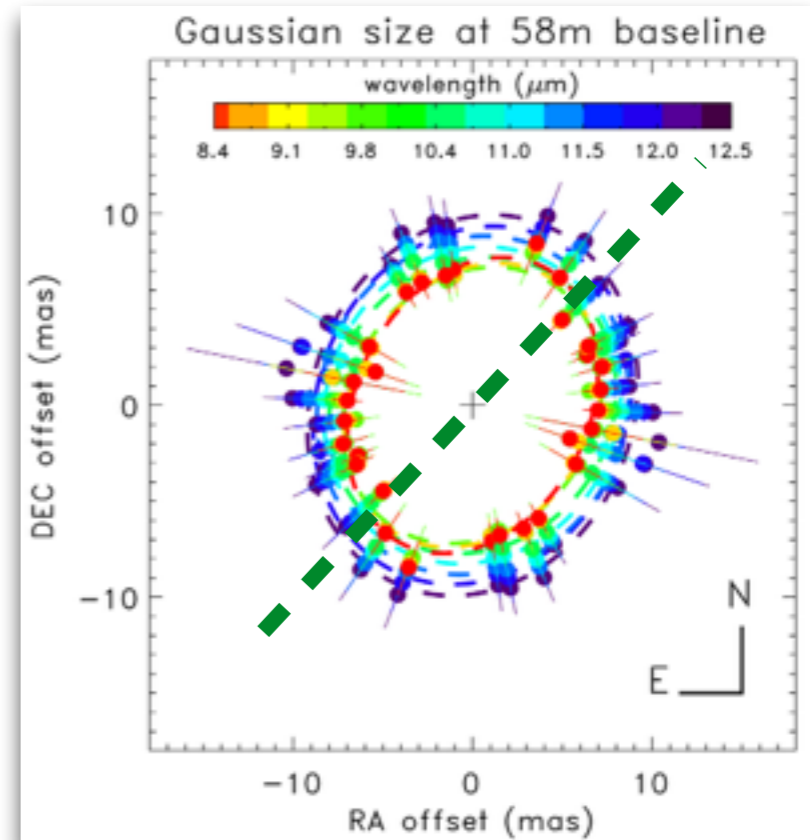


NGC1068;
López Gonzaga et al.2014

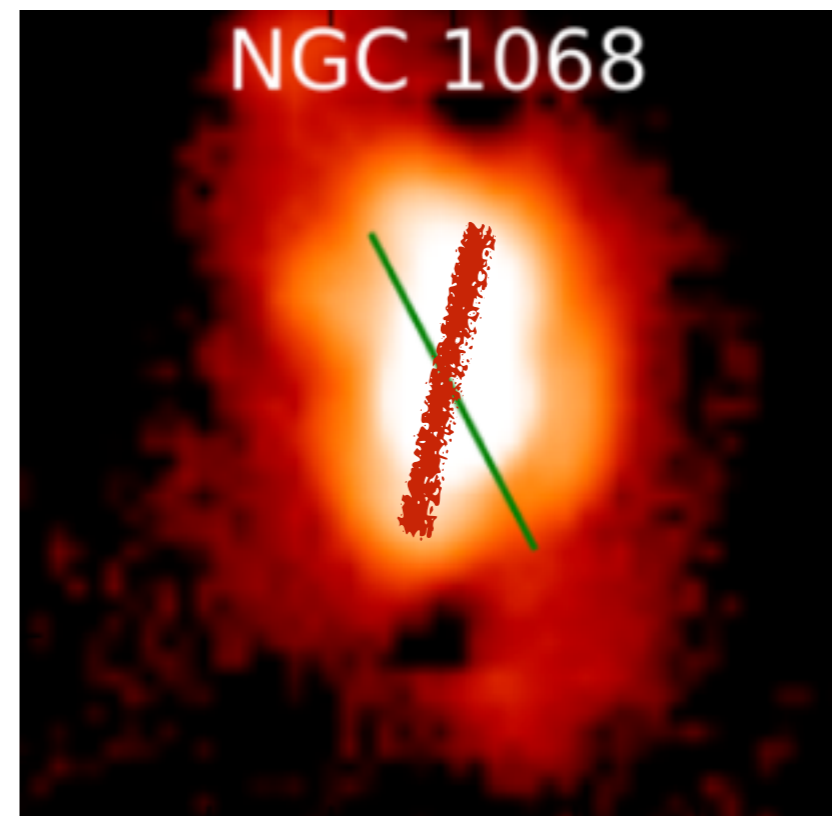
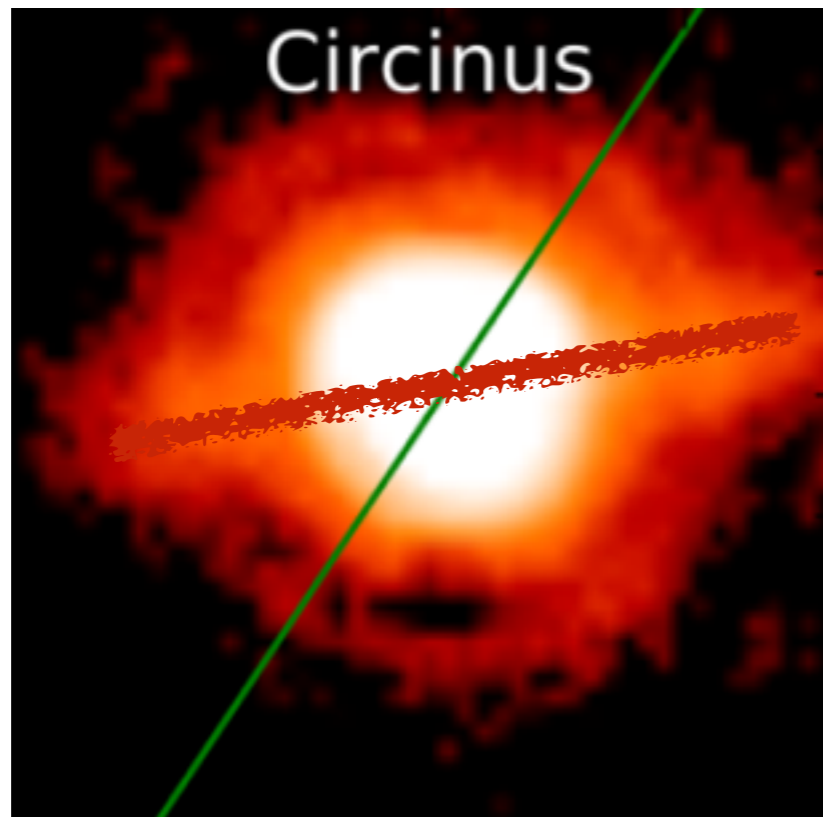
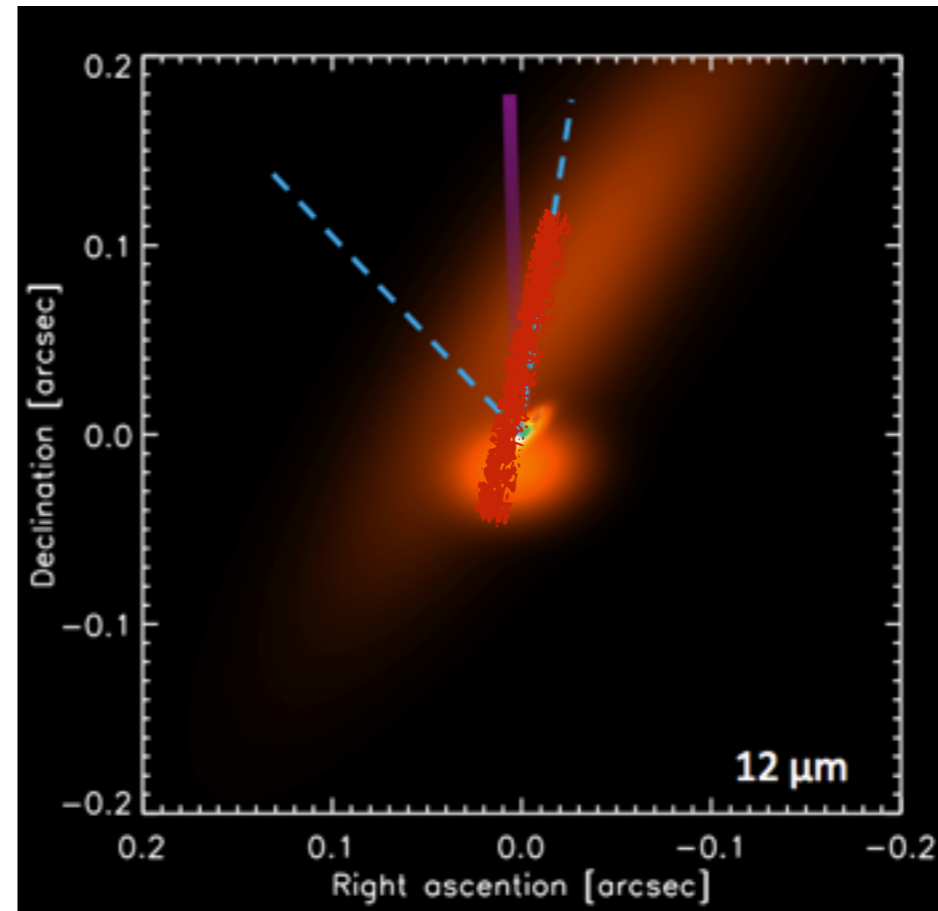
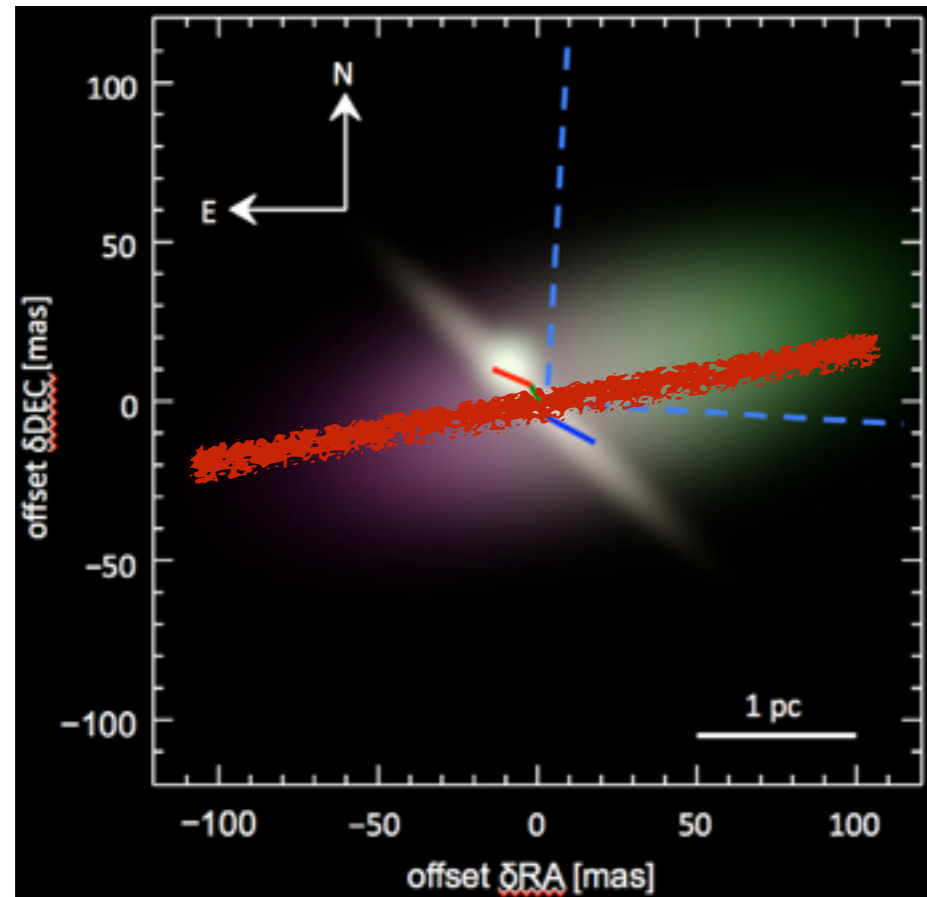
NGC3783; Hönig et al. 2013



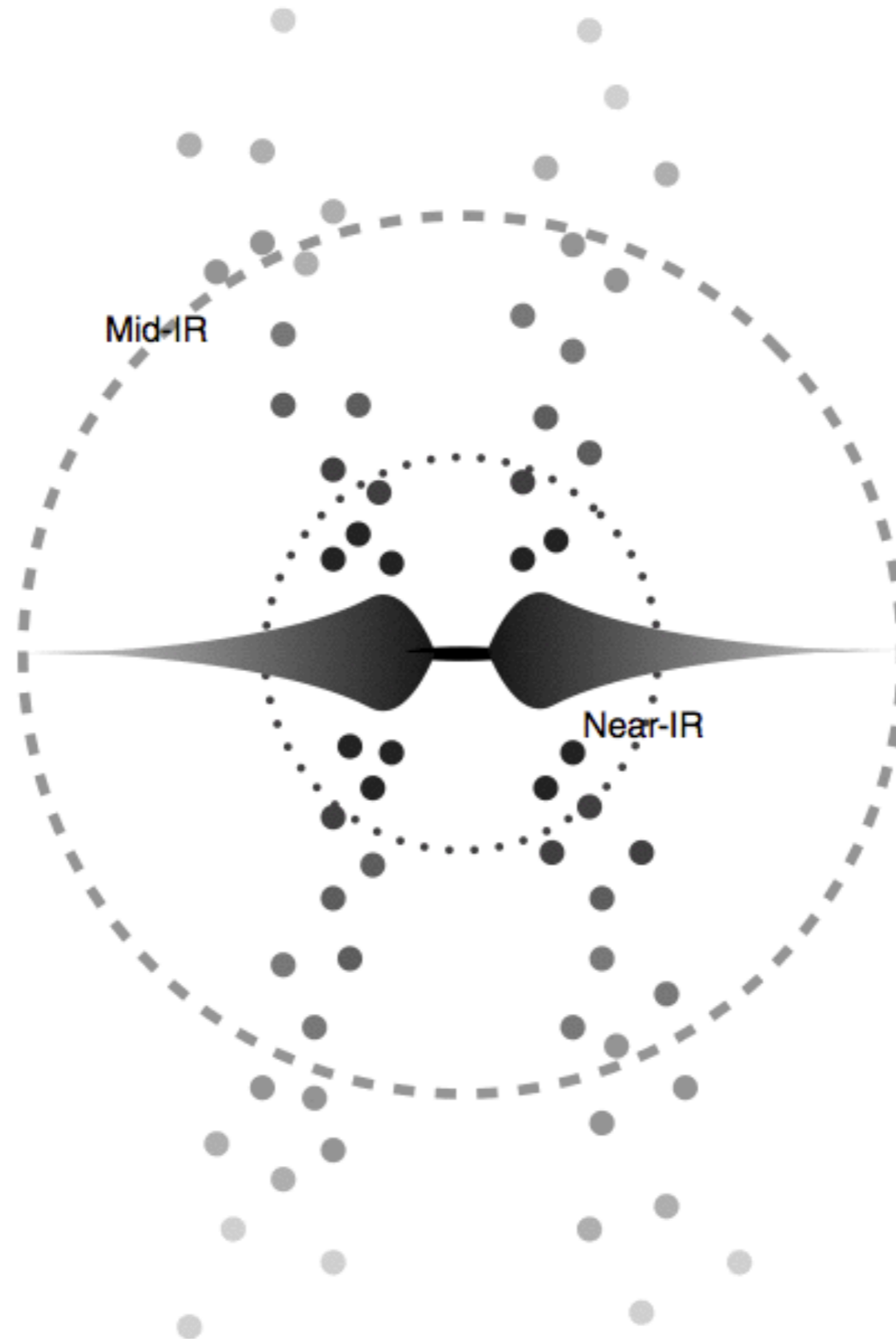
NGC424; Hönig et al. 2012



The small and large scale elongation are aligned and seem to trace the edge of the ionisation cone.



A new paradigm for the AGN dust structure?

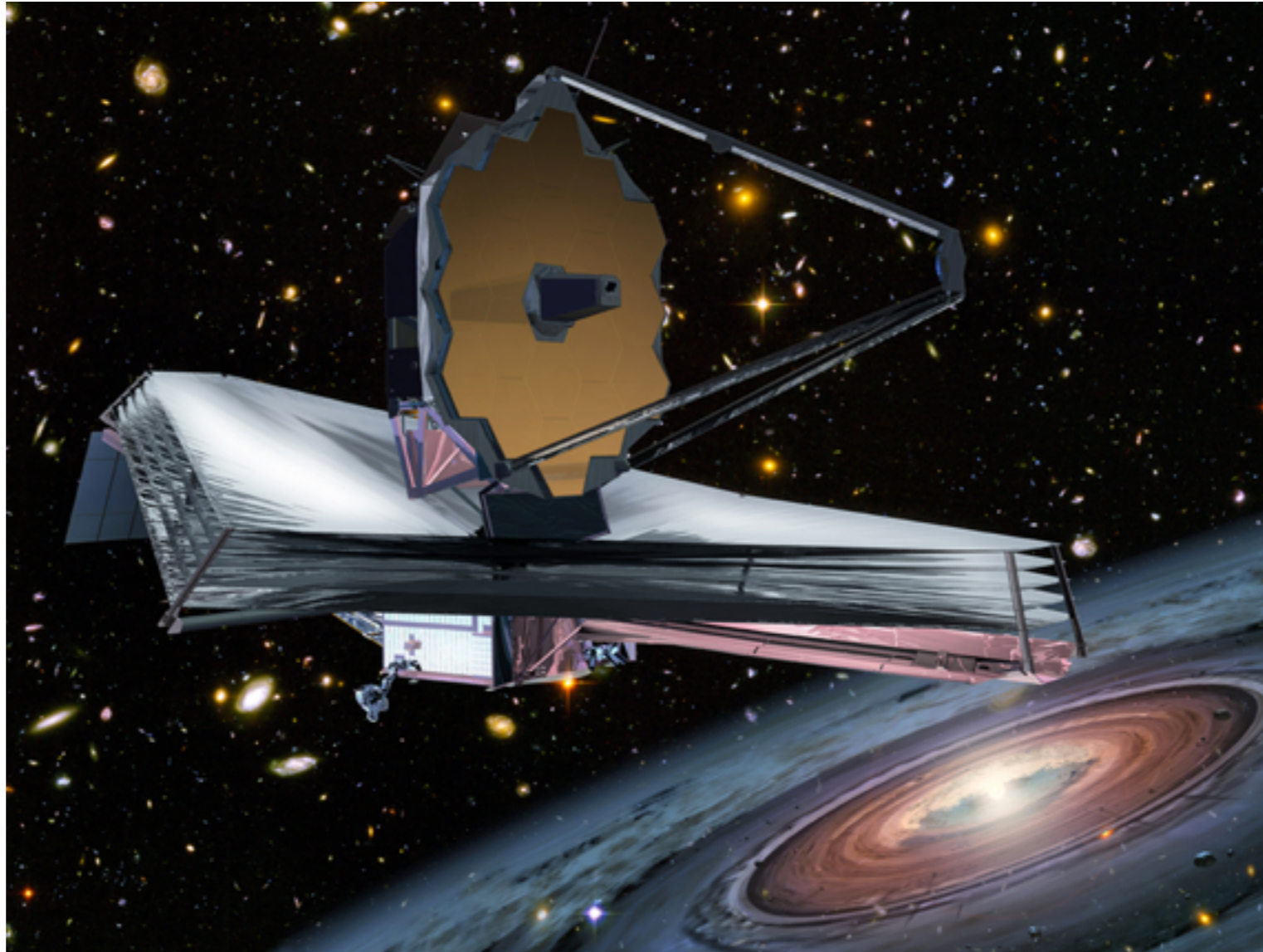


What have we learned?

- ☆ High angular resolution is important for AGN studies
- ☆ The AGN structures remain mostly unresolved in single-dish observations
- ☆ The resolved emission is coming from dust in/along the ionisation cone
- ☆ The mid-infrared emission of AGN is probably dominated by the polar emission (instead of the torus)



Going a thousand times deeper...



What are the prospects for JWST?

more sources

resolve gas & dust
morphology & kinematics

