

The central parsecs of galaxies in the IR

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PARSEC program

- Multiwavelength study of centres of the nearest galaxies at high angular scales $\theta < 0.2''$
- **High spatial resolution in IR**, routinely available with adaptive optics and interferometry
- Most done with VLT

With J. Reunanen (Tuorla), K. Tristram, J.A. Fernandez Ontiveros, G. Weigelt (MPIfR), K. Meisenheimer (MPIA), N. Neumayer (ESO), F. Muller-Sanchez (UCLA), S. Honig (UC), J..Acosta, M. Montes, M. Mezcua (IAC), S. Markoff (UVA)

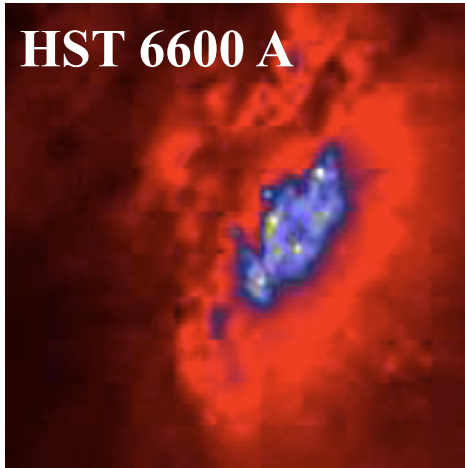
Some of the nearest ...

		1''/parsec	Core size in parsecs	
			2 μm^{AO}	10 μm^{l}
S2	Cen A	16	< 1	1.4 - 0.6
S2	Circinus	19	~ 2	2 - 0.4
S2	N1068	70	3 - 0.5 ^S	3 - 0.45
LLAGN	Sombrero	50	< 8	
S1.5	N4151	70	< 7	~ 2
LLAGN	M 87	80	< 11	
S2	N1365	87	< 6	~ 2
S1	N1566	96	< 11	
LLAGN	N1052	100	< 13	
S2	MCG-05-23-16	168	< 19	3
S1	N3783	196	< 16	3.6
S1	N7469	330	< 26	10
S1.5	Mrk1239	384	< 40	< 6
QSO	3C273	3200	<180	< 37

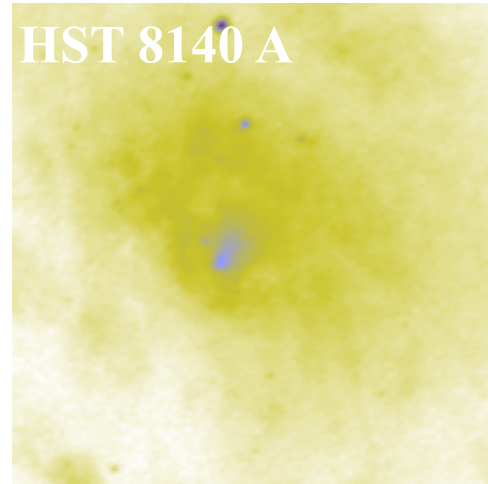
Wittkowski+04, Jaffe+04, Neumayer+07, Tristram+09, Prieto+04,10, Burtscher+09,10

The central parsecs.... the true location of the nucleus

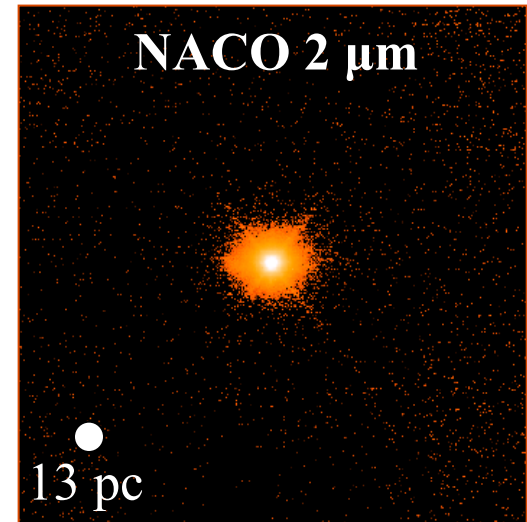
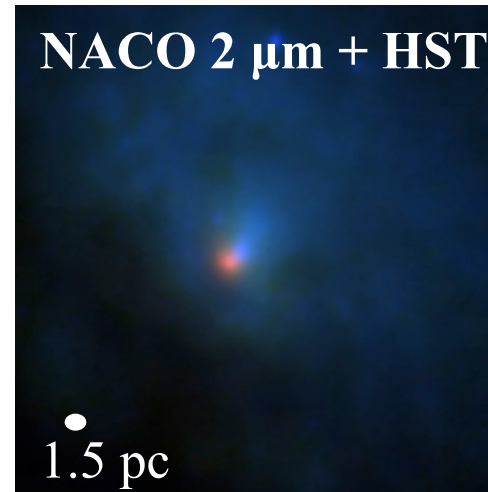
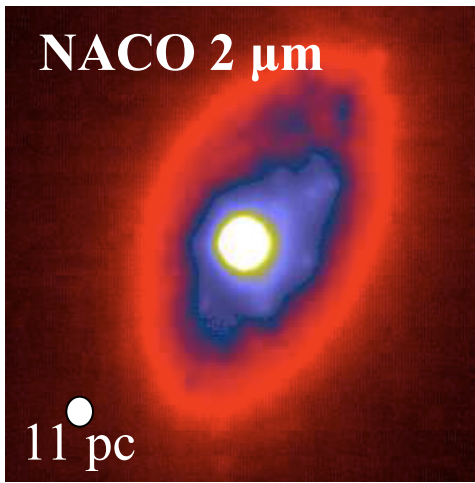
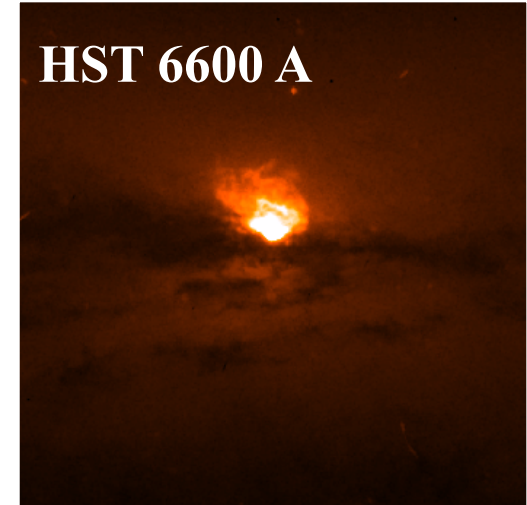
NGC 7582



CIRCINUS



NGC 5506

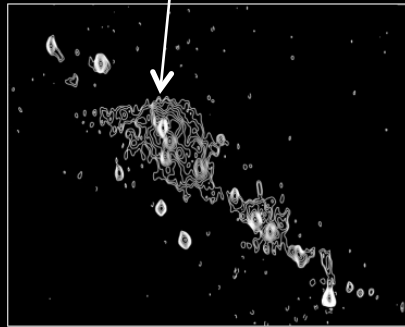


Obscured nuclei show up from 2 μm onward

The extreme...

NGC 253

radio peak



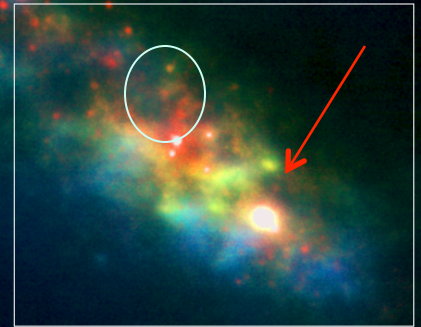
VLA-A
2cm

22"x22"

• 2 pc

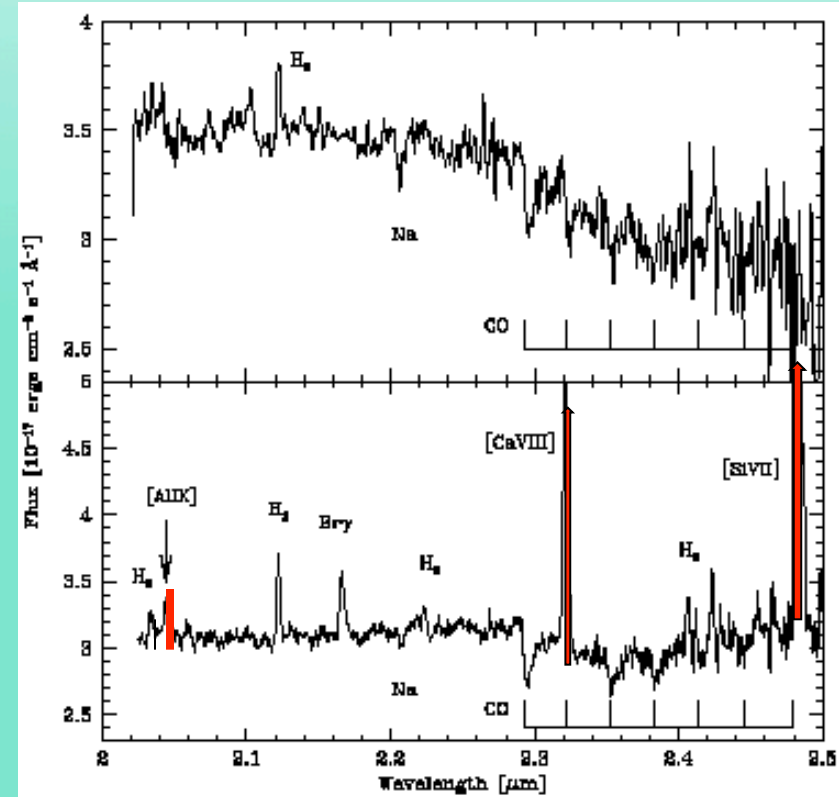
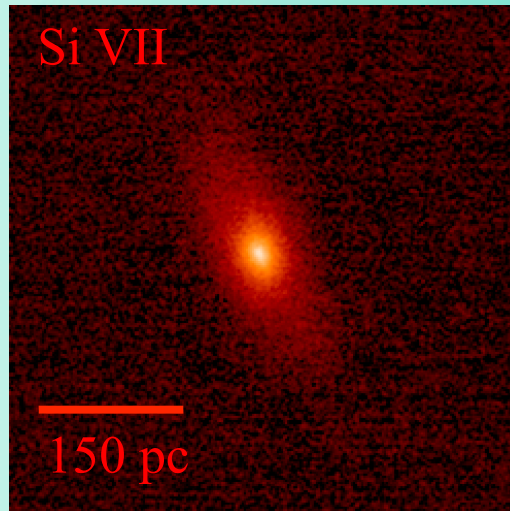
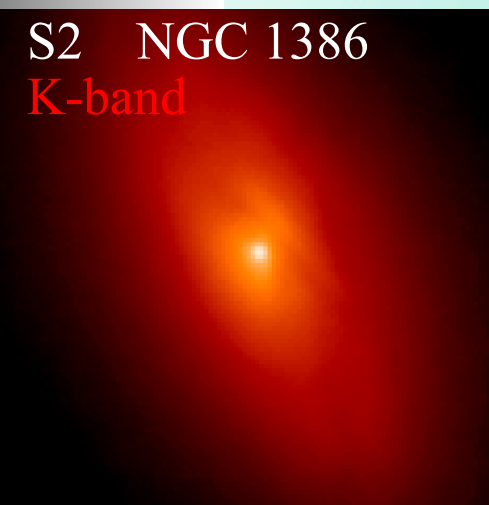
Stellar kinematic center

IR peak



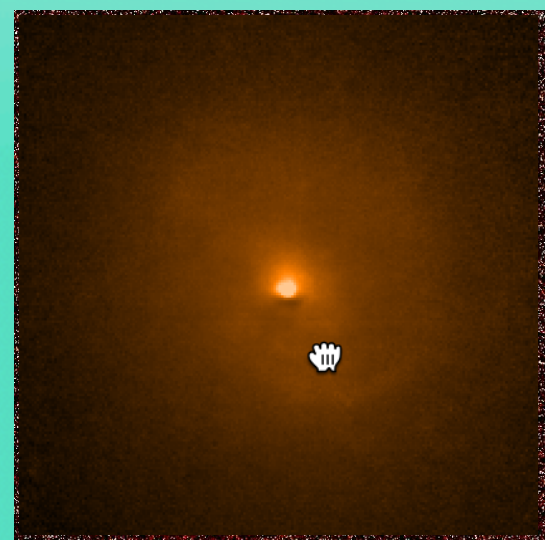
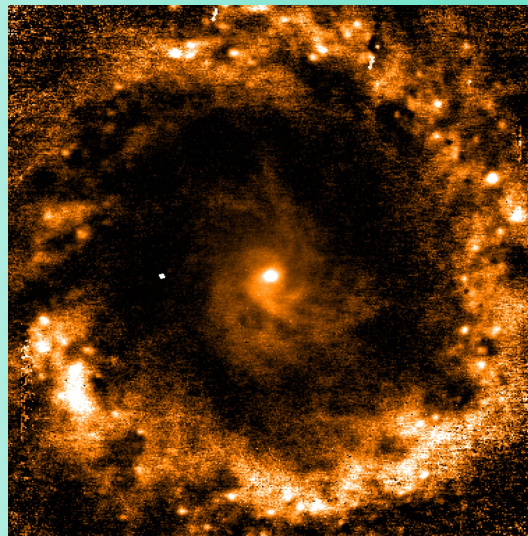
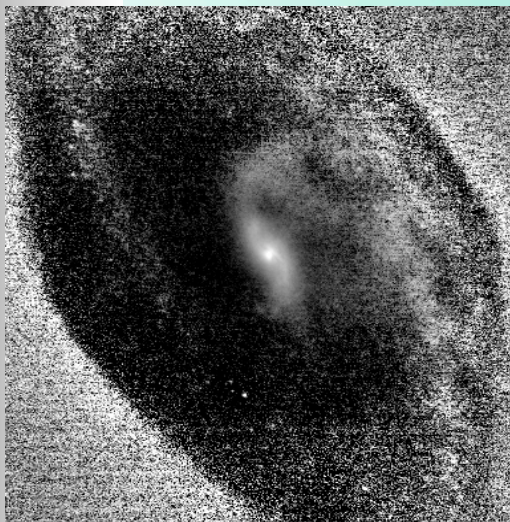
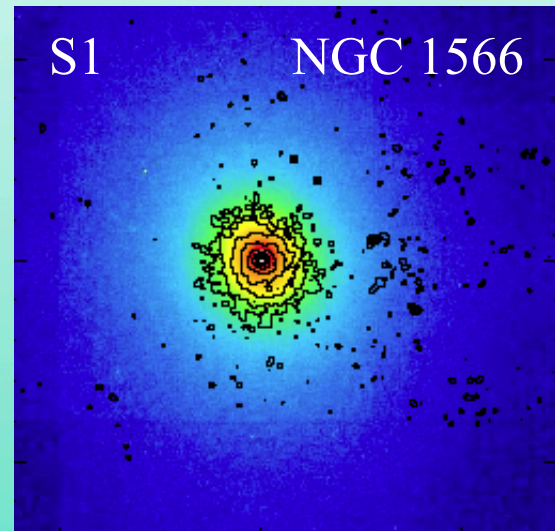
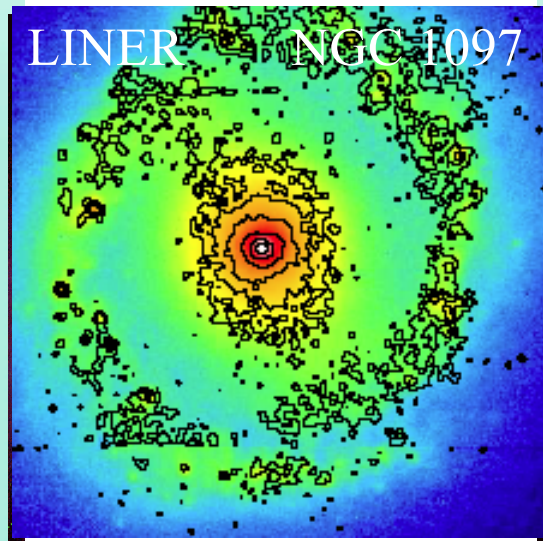
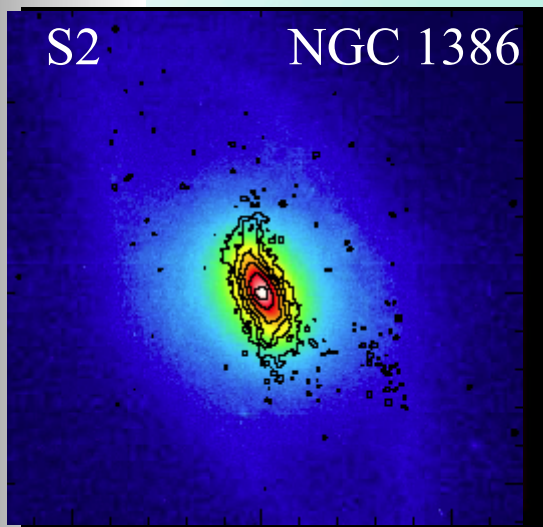
VLT/NaCo
J (blue), Ks (green), L (red)

The central 100 pc coronal line gas: dominant in Seyfert and Qso, absent in LLAGN



The central kpc in the IR: molecular gas and dust

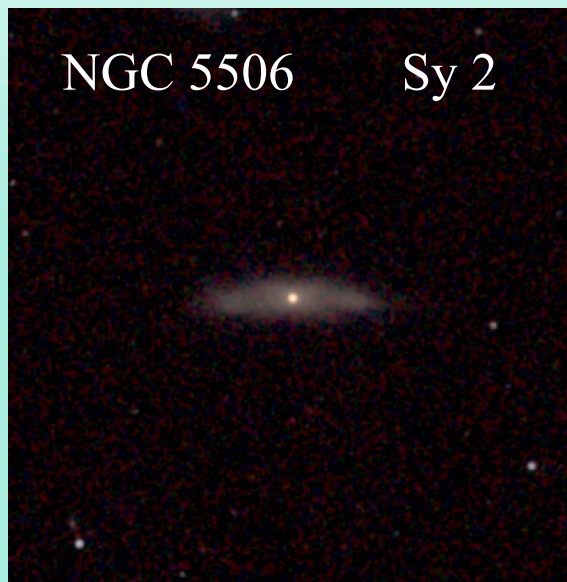
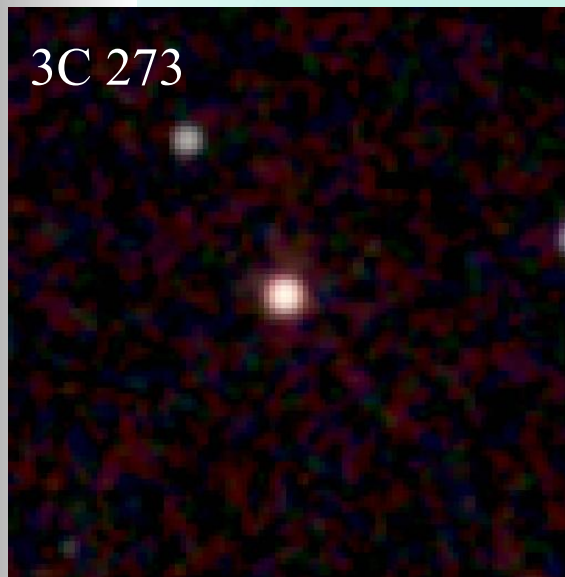
NACO H₂ contours



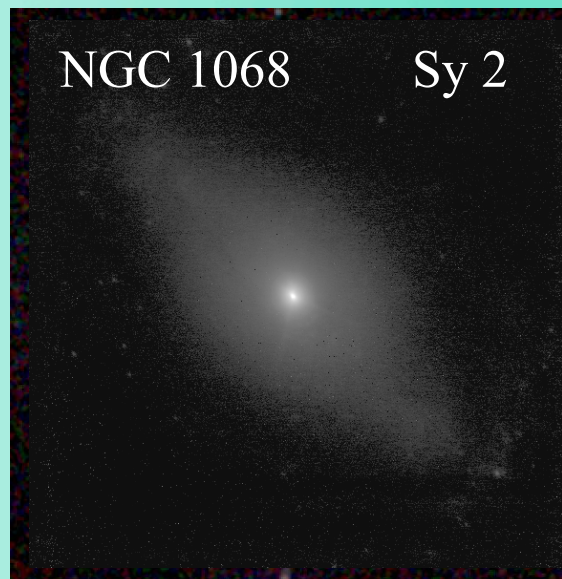
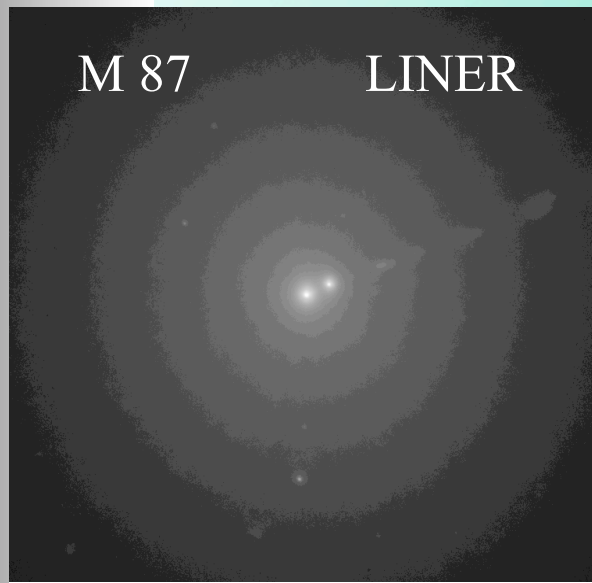
NACO J - K

Reunanen et al.

AGN and their hosts: who is stronger in the IR?



Dominant AGN

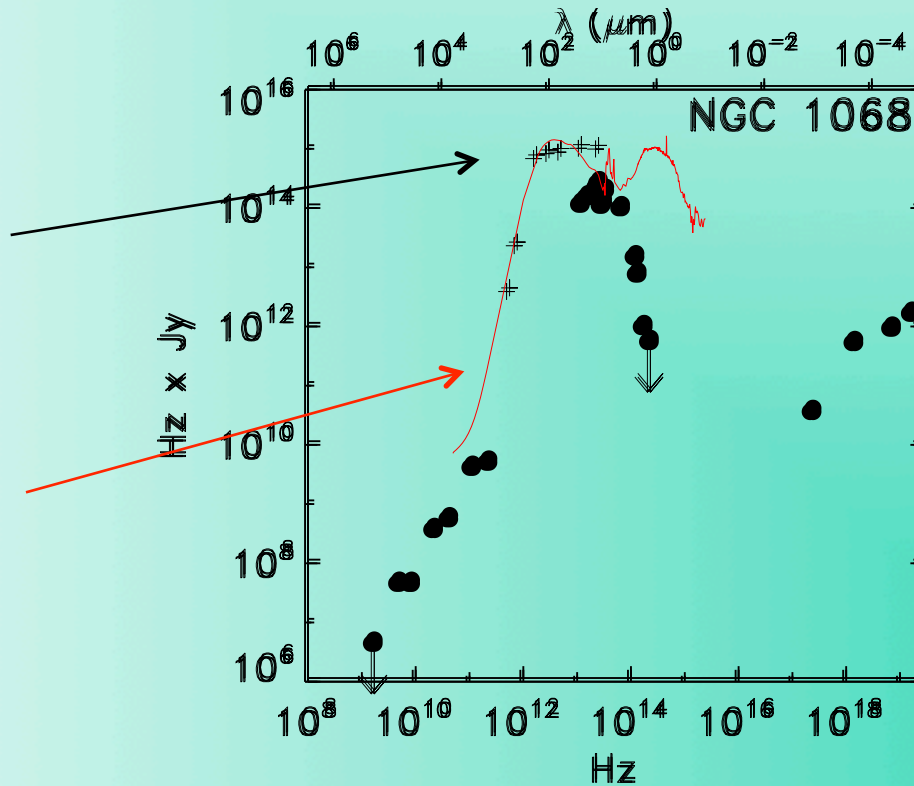


Dominated AGN

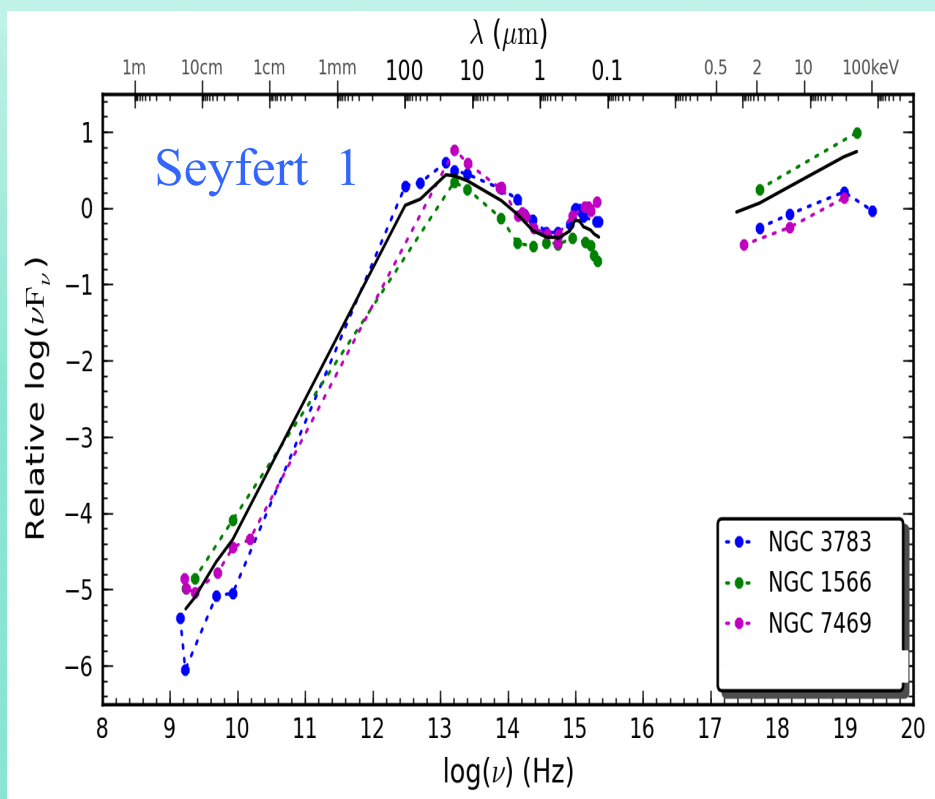
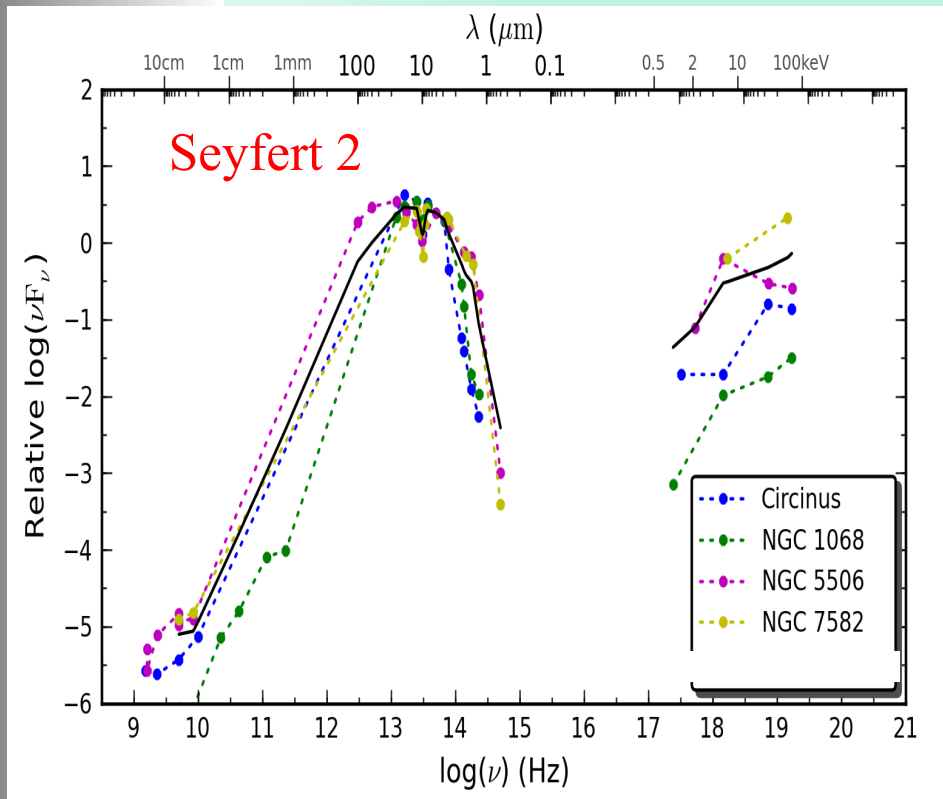
SED of the central few parsecs

comparison
with low
resolution IR

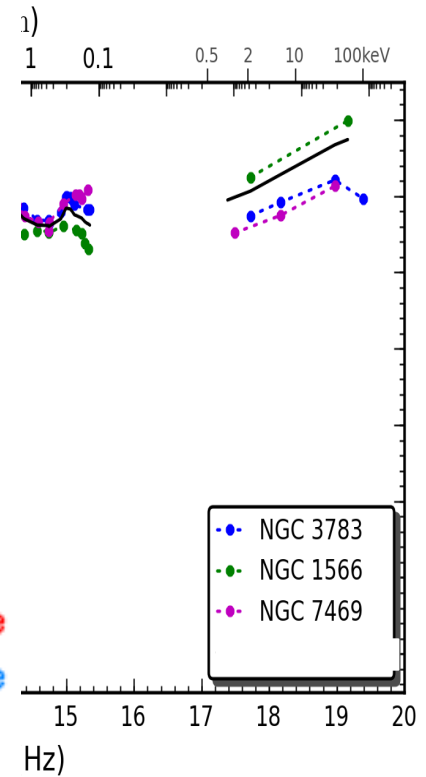
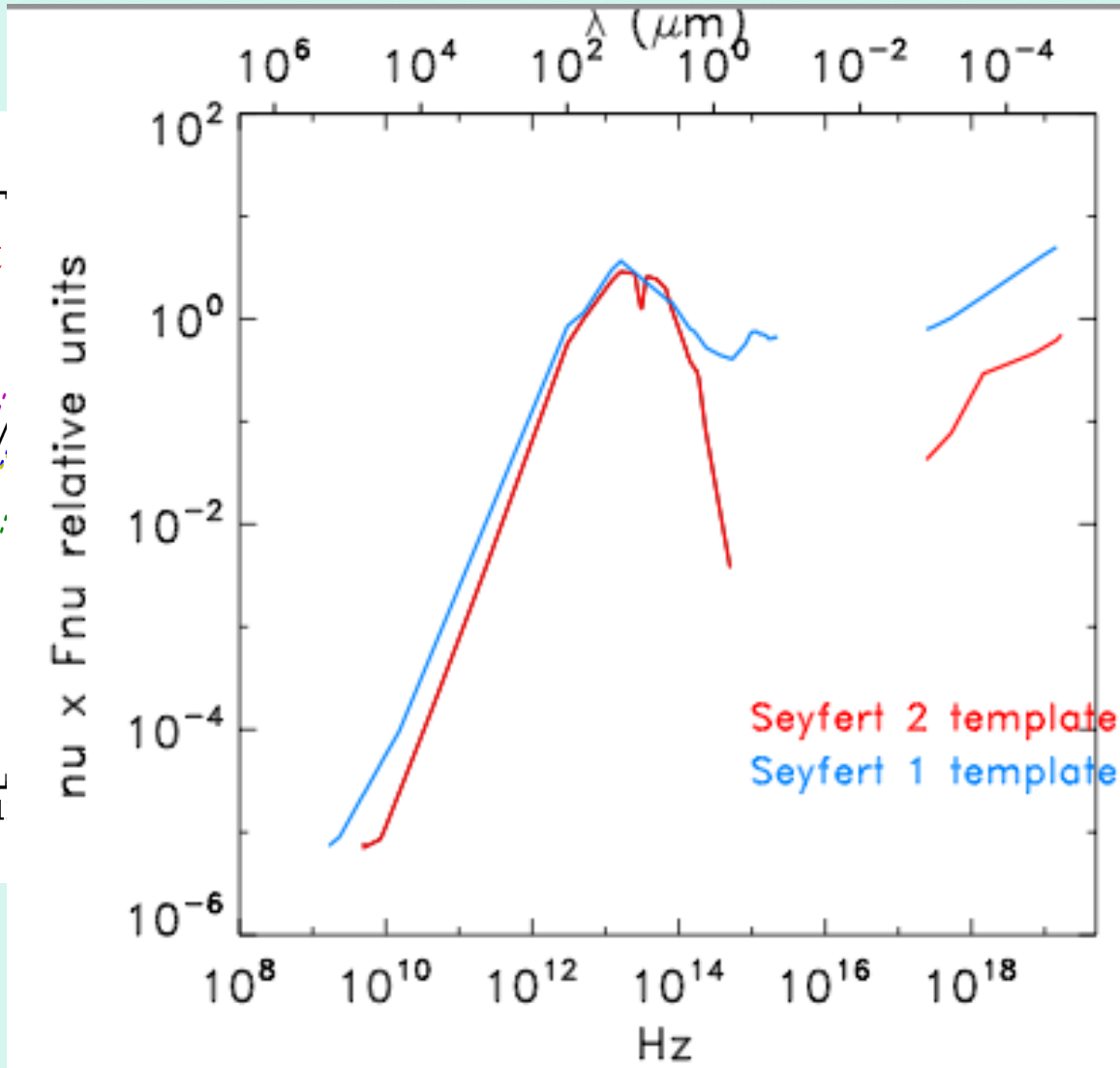
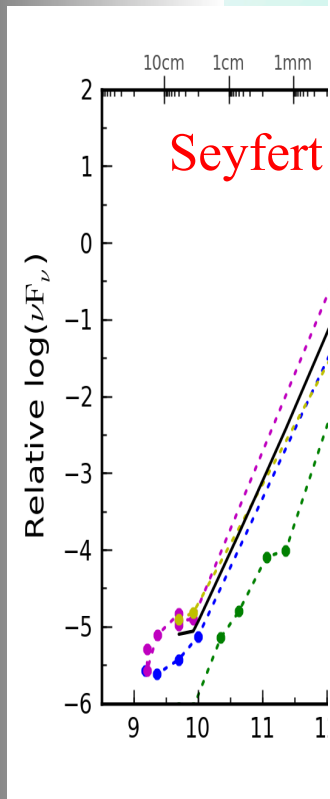
average AGN
type 2 SED
(Polletta +04)



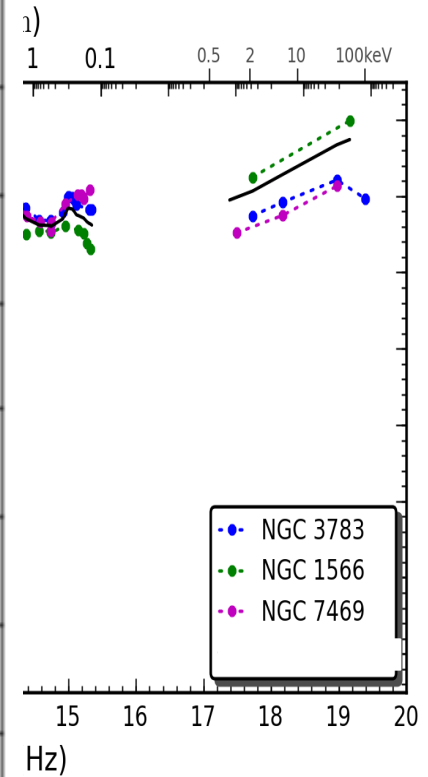
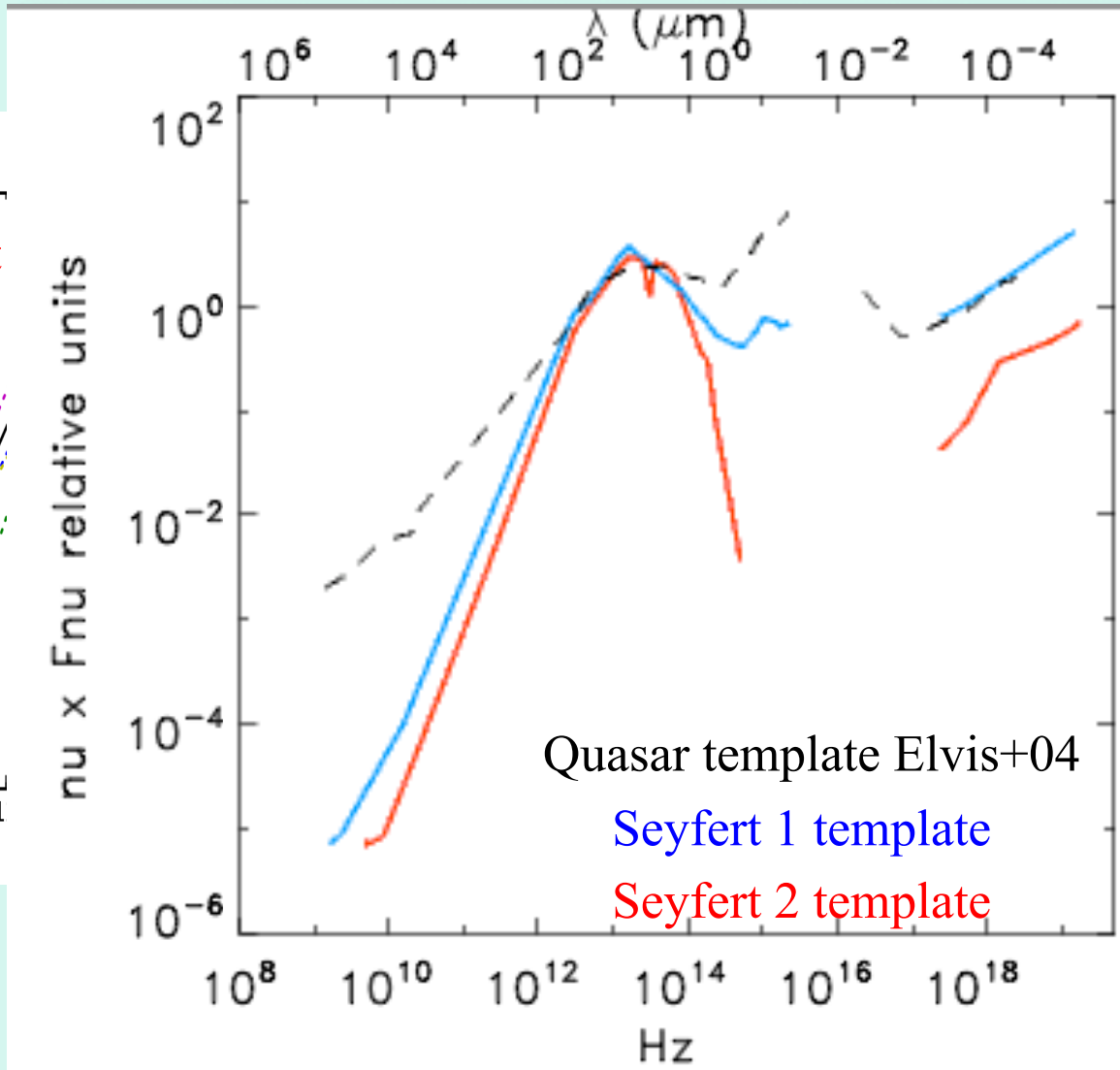
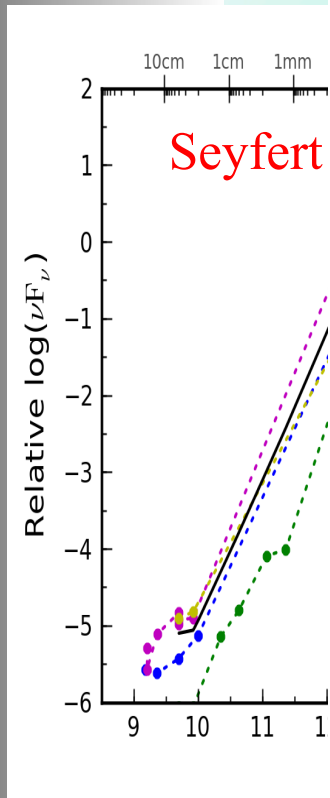
Average SEDs of nearby AGNs



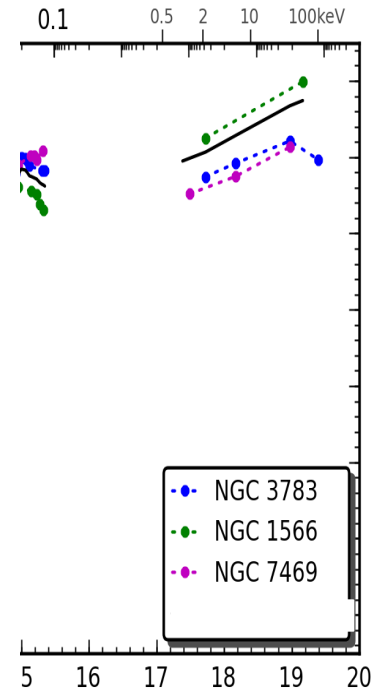
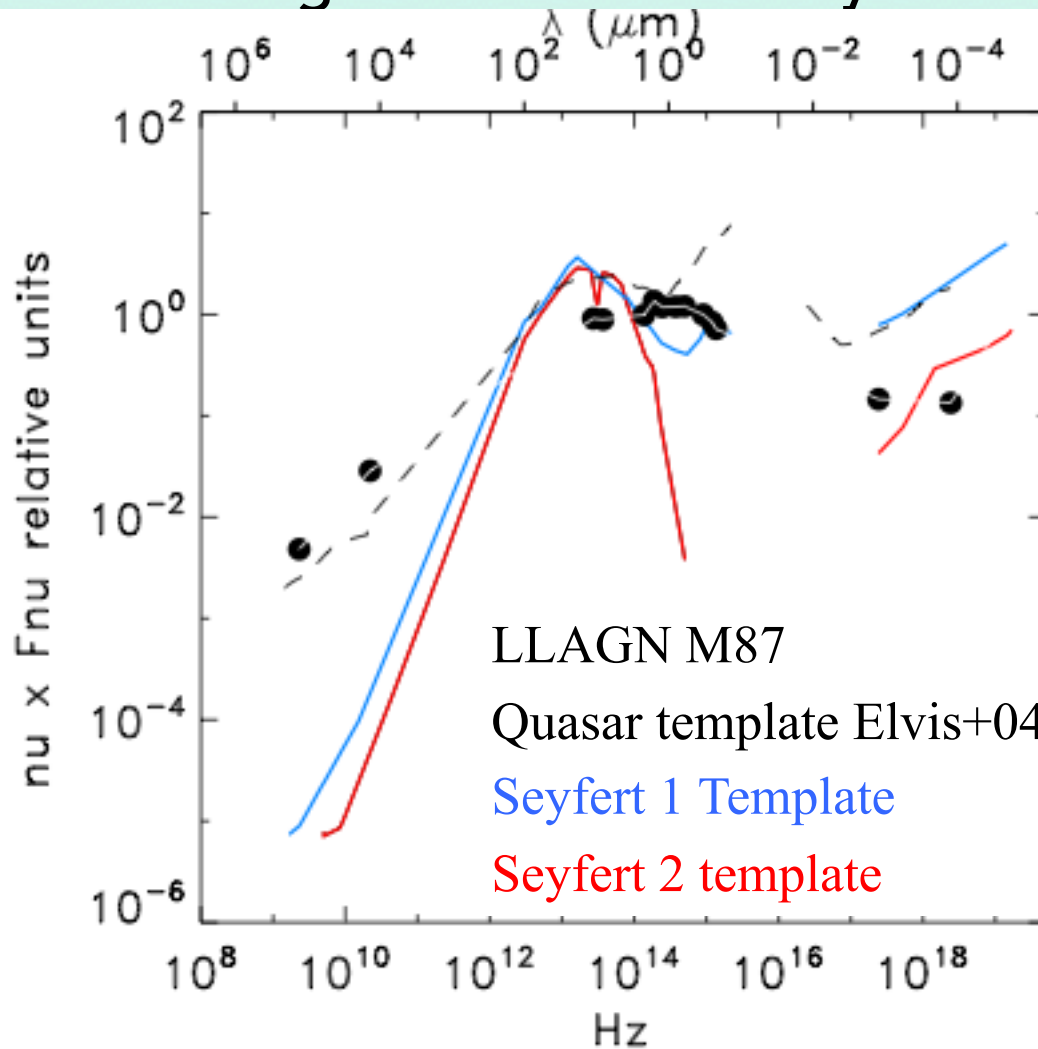
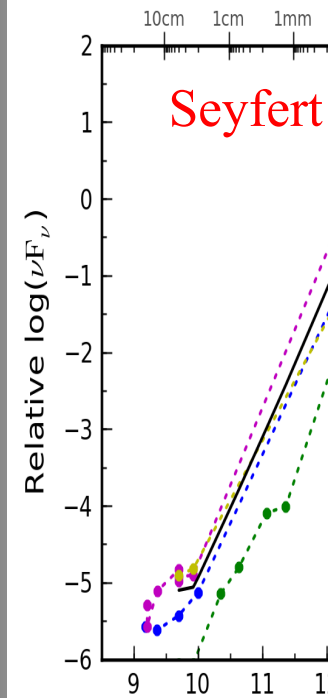
Average SEDs of nearby AGNs



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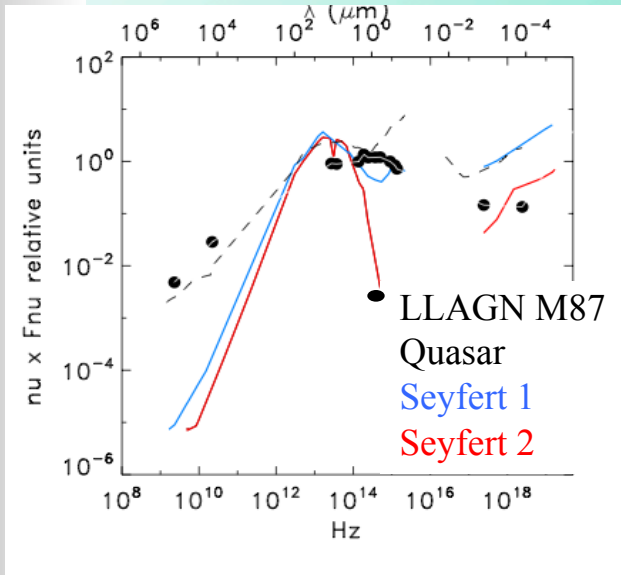


Nearest galaxy cores in the IR

- Nucleus of the galaxy put in place (with NACO)



- Parsecs scale SED templates of medium power AGN (w. NACO-VISIR):



- smooth transition from medium to high power AGN
- low power AGN $< 10^{42}$ erg/s resist fitting the standard AGN scenario