Genuine spectral energy distributions of AGN

M. Almudena Prieto (IAC)

Como, June 2009

PARSEC program

High spatial resolution study of the Nearest Active Galactic Nuclei

Compilation of the highest spatial resolution data available

- Angular scales of $\theta < 0.1$”
- UV + OP + IR + radio

What is new are the achieved angular scales in the 1 to 20µm from 8 – 10 class telescopes

- 1 - 5 µm → $\theta < 0.1$”
- 10 - 20 µm → $\theta < 0.5$”
- Interferometry at 10 µm → $\theta < 0.05$“

What we have:

- HST at 0.3 - 0.9 µm → $\theta < 0.1$”

What we partially have:

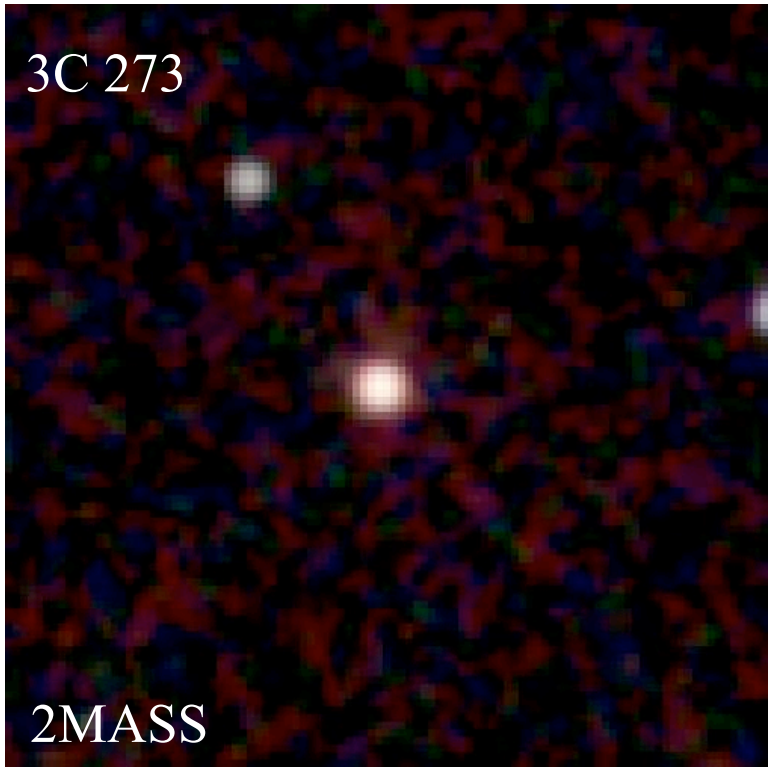
- VLA/ VLBA → $\theta < 0.1$”

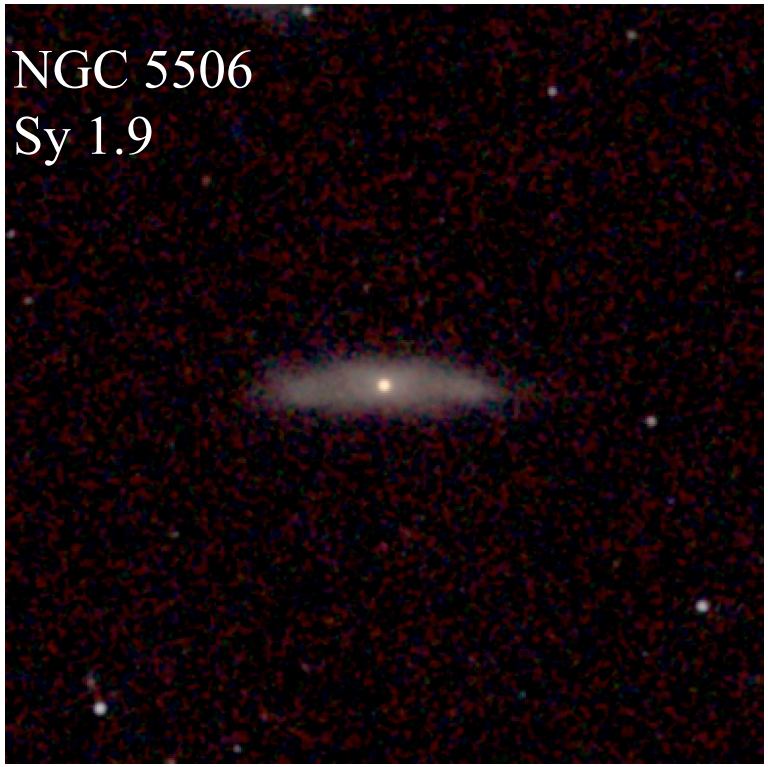
Some of the nearest …

		1”/pc	Core size (FWHM) 2 um - 20 um
S2/RG	CenA	16	< 0.5 pc
S2	Circinus	19	~2 pc
S2	N1068	70	~ 2 pc x 1 pc
S1/Li	N1097	70	< 25 pc
S2	N1386	94	< 30 pc
S1	N1566	96	< 30 pc
S2	N7582	150	< 30 pc
S1	N3783	280	< 70 pc
S1	N7469	470	< 100 pc
Qso	3C273	4600	< 2000 pc

Prieto et al. 2004, 05; Jaffe et al. 2004, Meisenheimer et al. 2006; Haering-Neumayer et al. 2007, Reunanen et al. 2009.

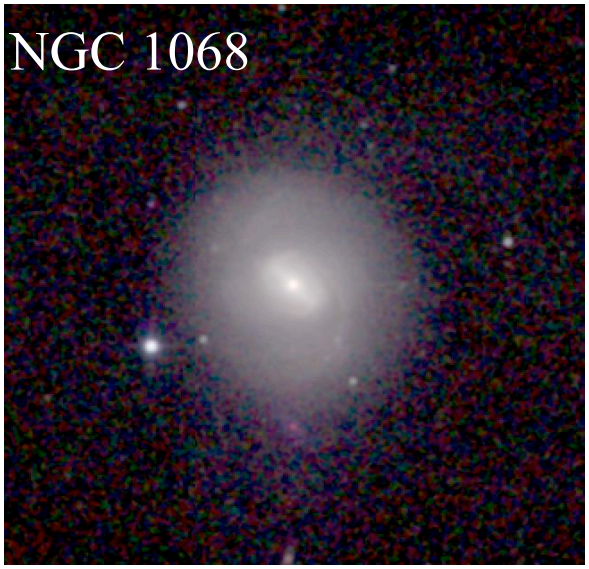
AGN in the IR

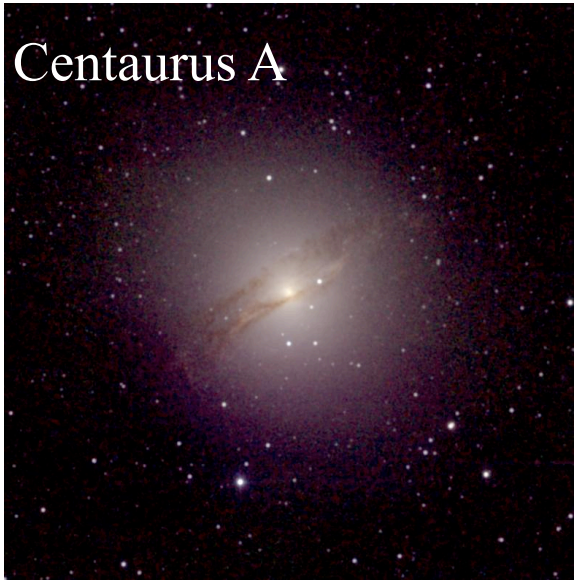


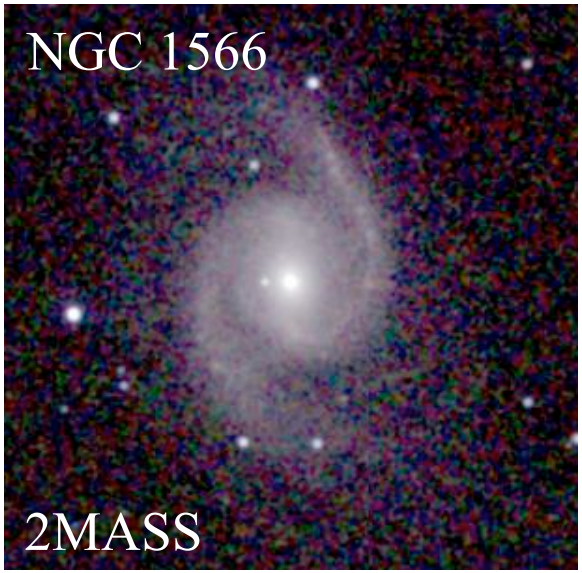


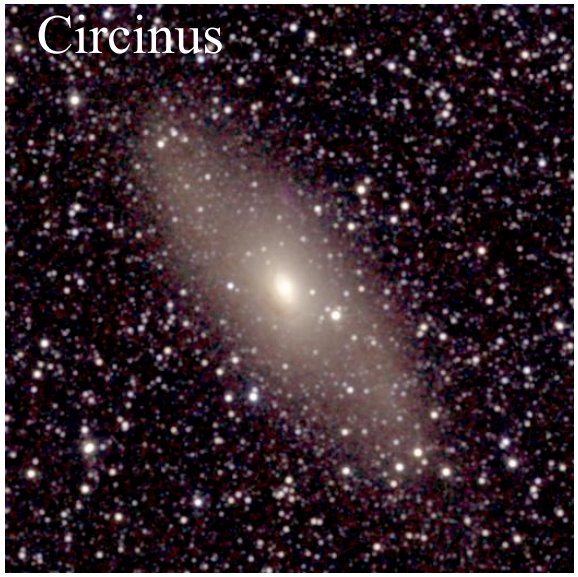
Some AGN dominate the galaxy light regardless of the aperture size

AGN in the IR



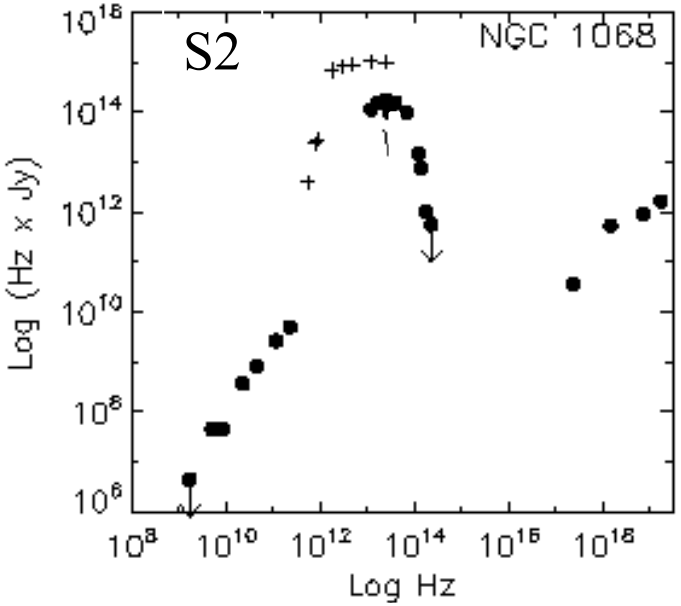




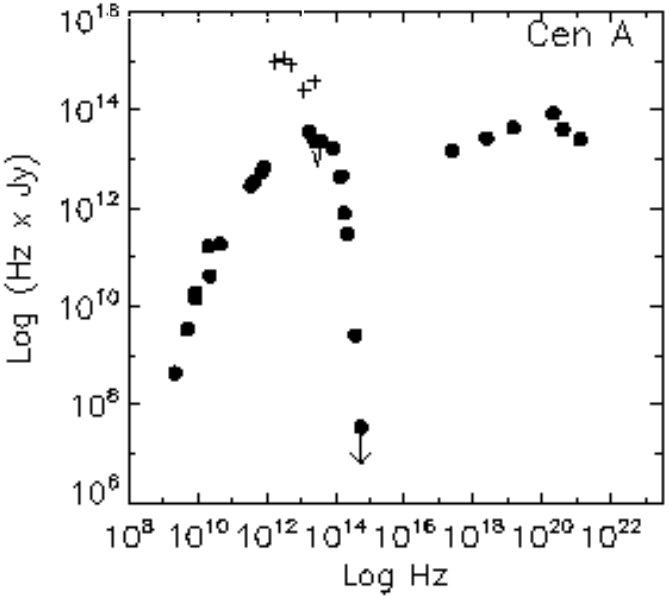


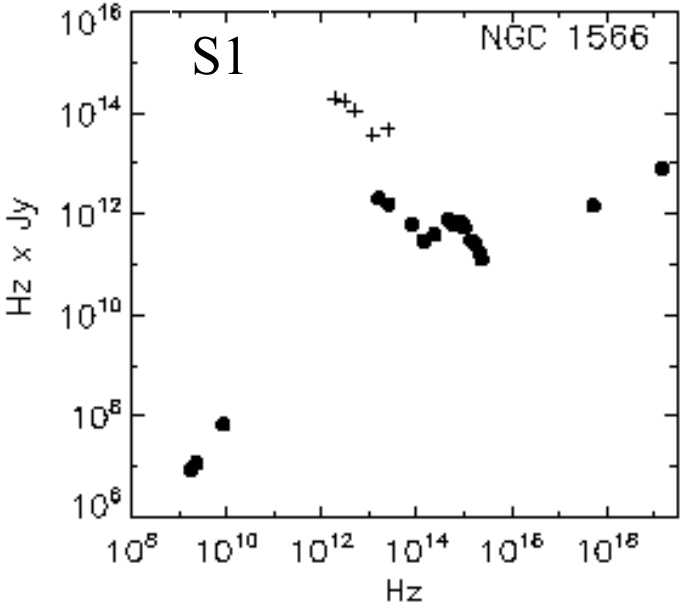
In others, the galaxy dominates the IR light by at least an order of magnitude

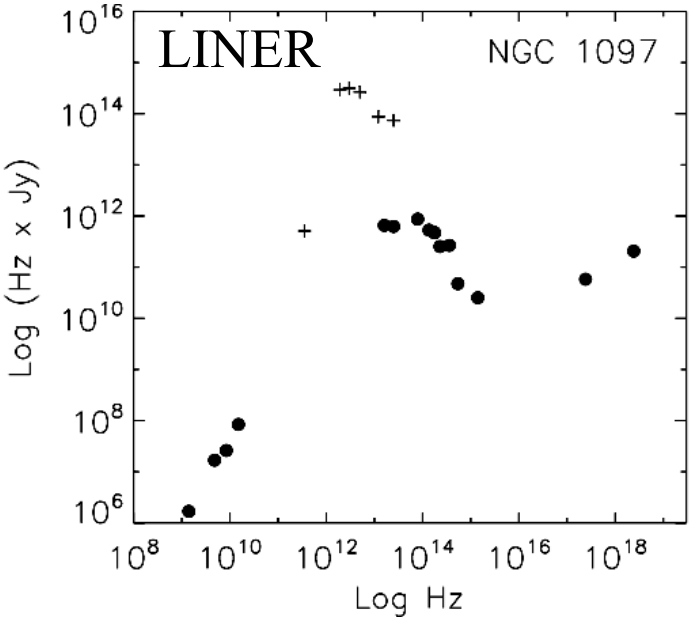
Modest AGN: their IR luminosity is a few percent of the total IR integrated light



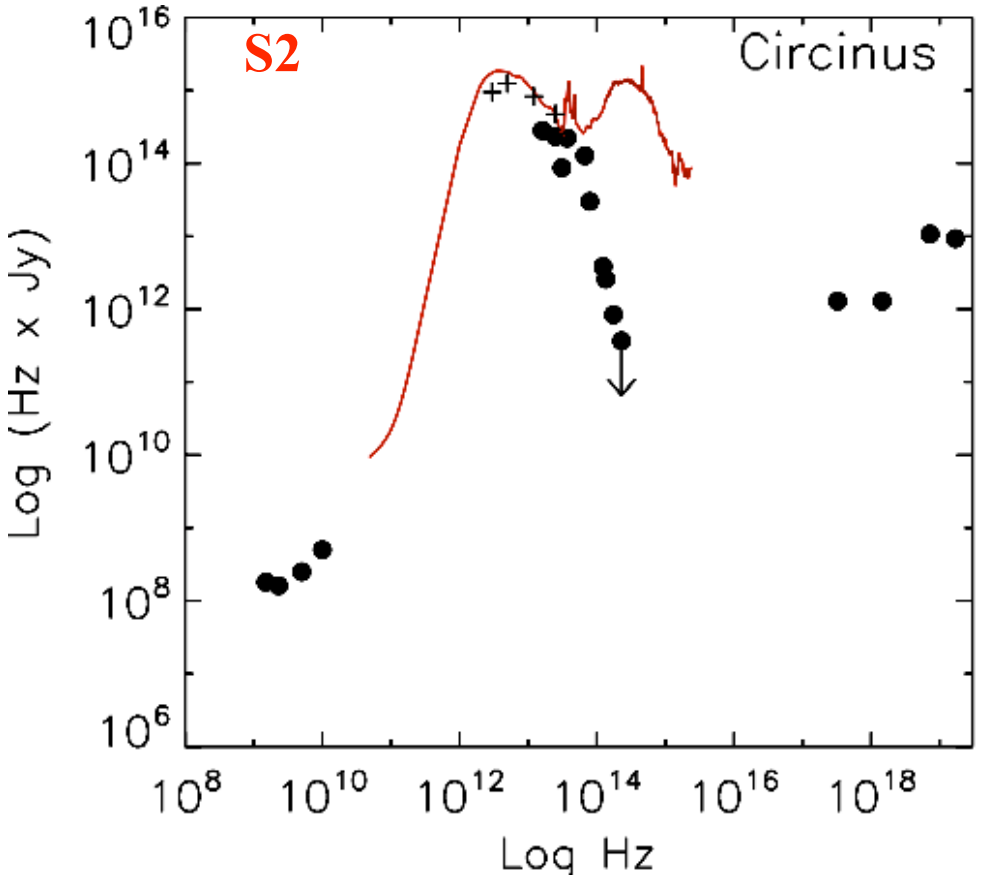
S2/RG

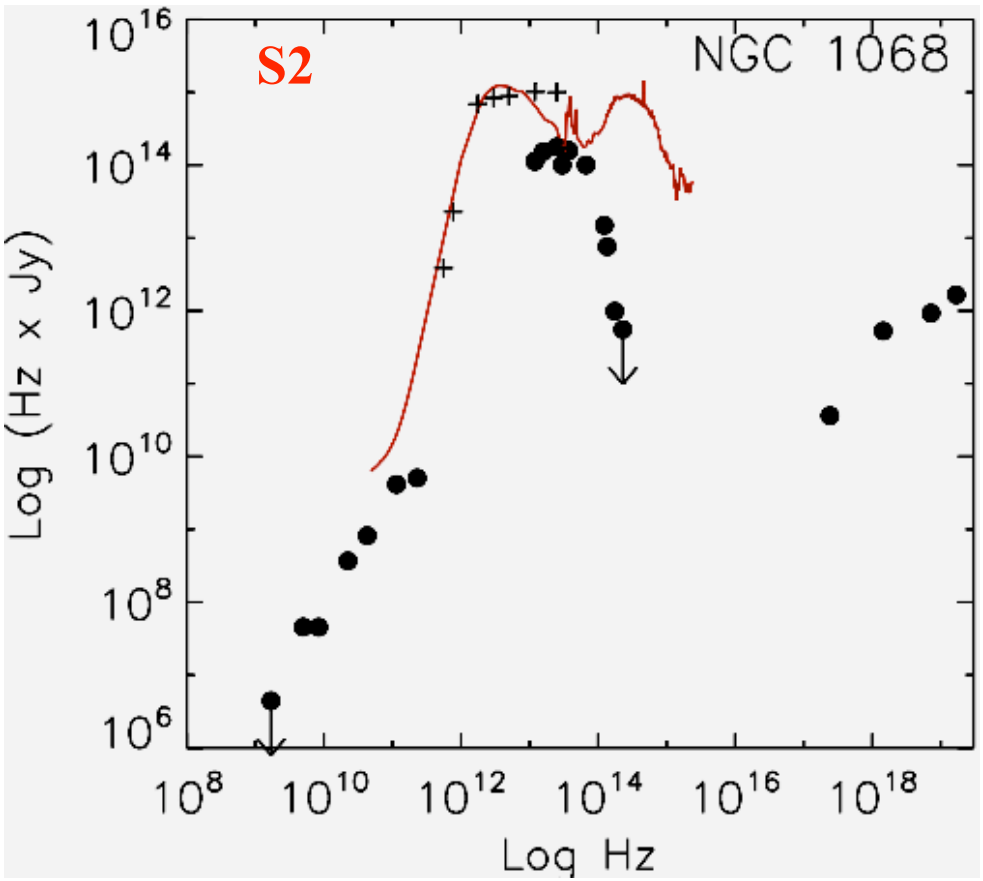






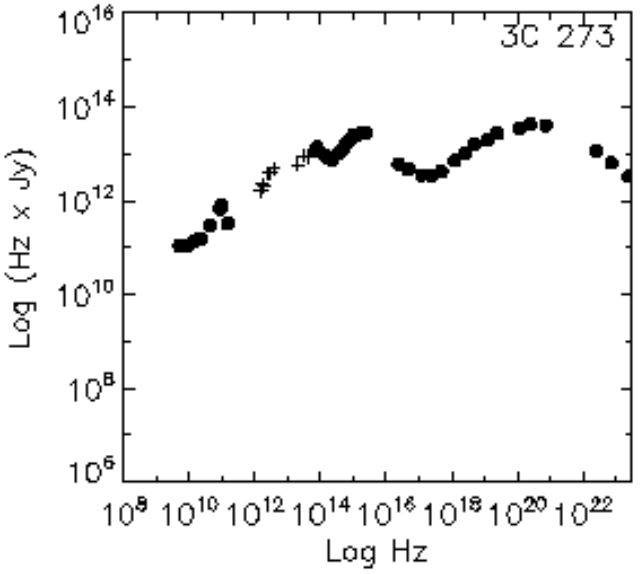
Comparison with an average Seyfert 2 SED (from Polletta et al. 2007)



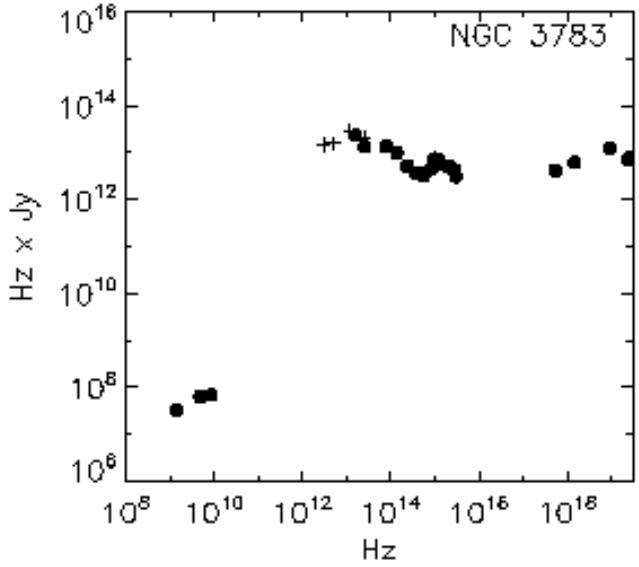


Dominating AGN: their IR luminosity is ~100% of the total IR emission of the galaxy

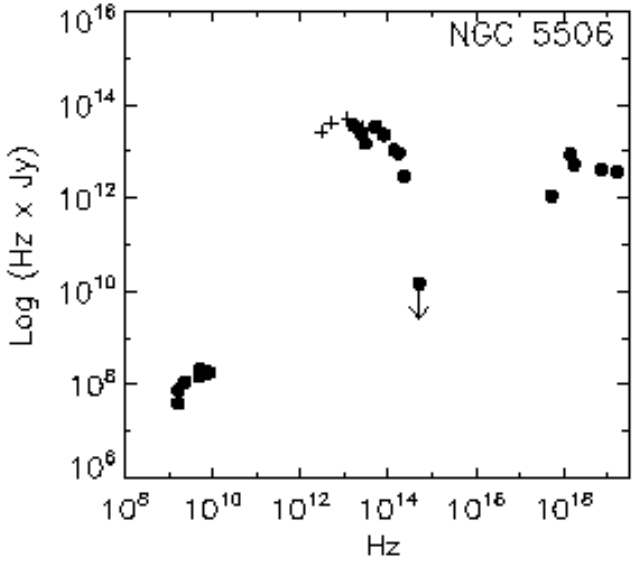
QSO



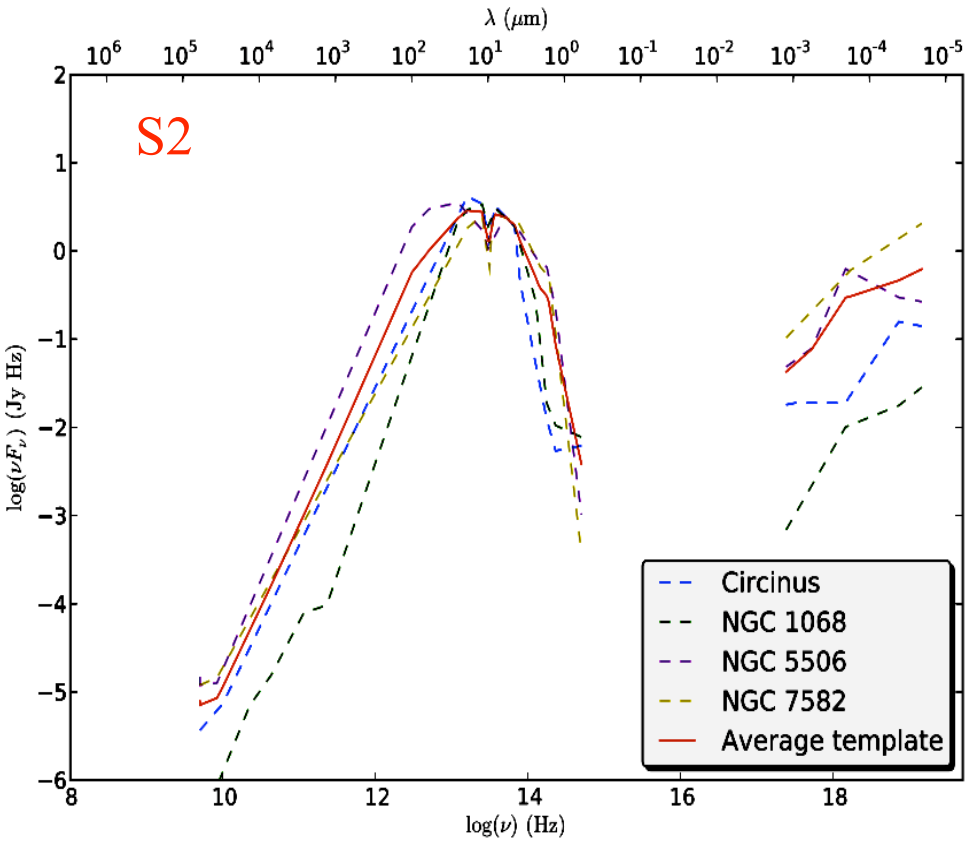
S1

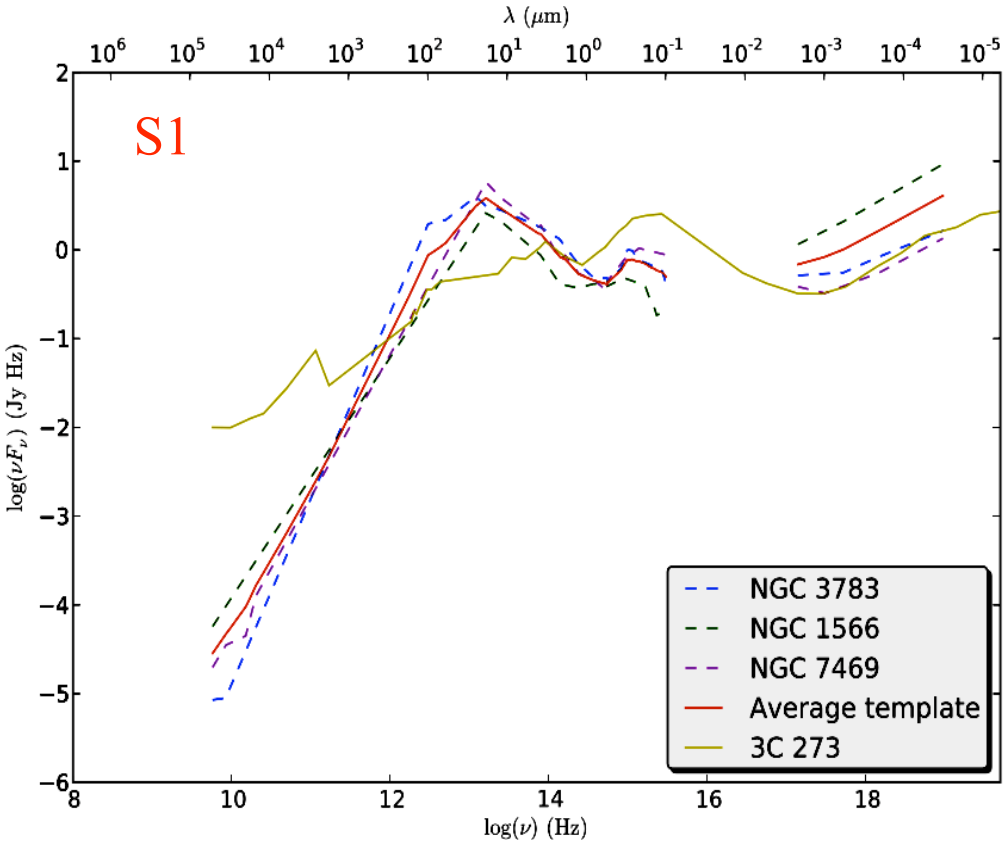


S2



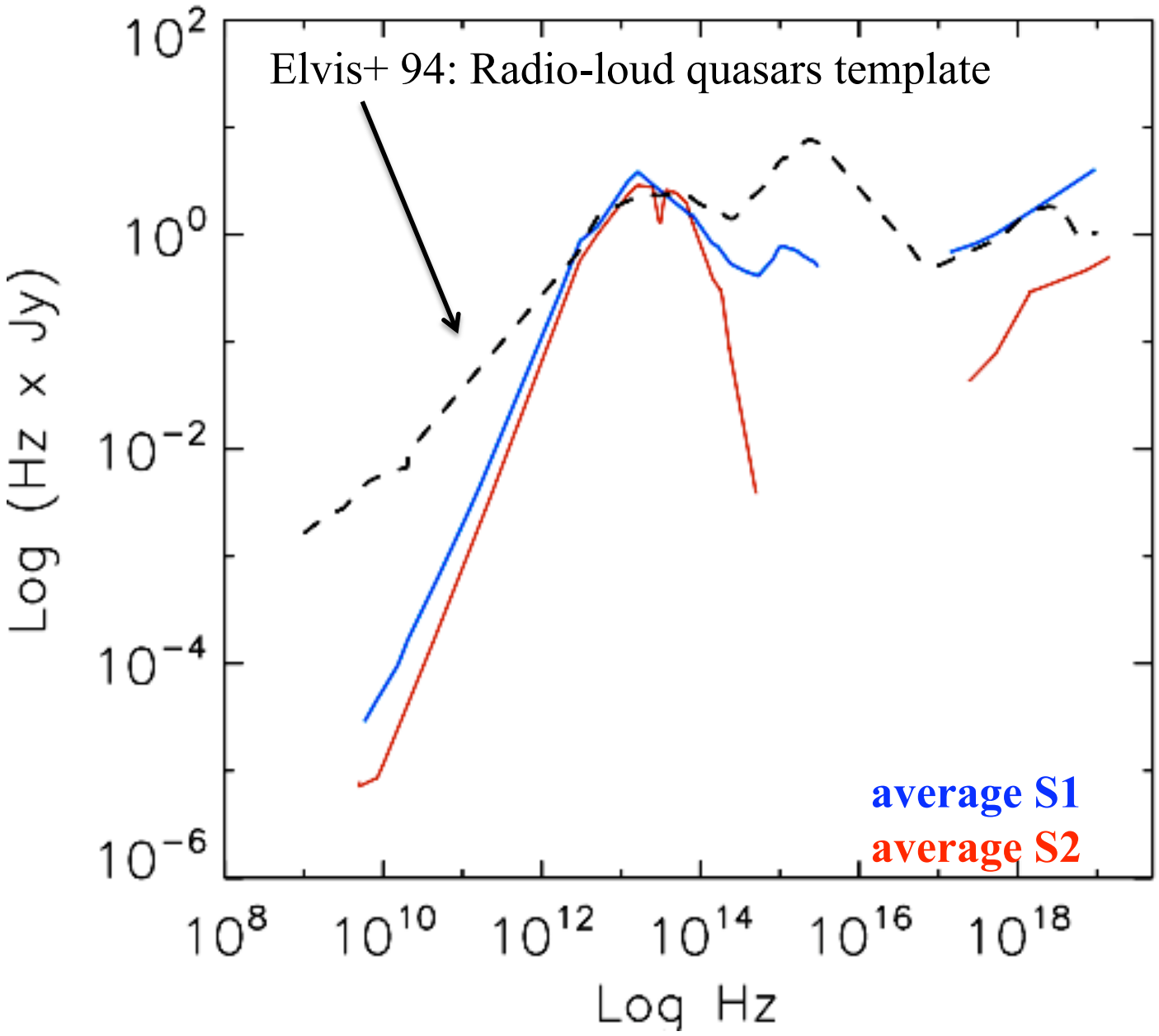
Average SEDs of nearby AGNs





Fernandez-Ontiveros et al. 2009

Average SEDs of nearby AGNs



The true energy output in the IR

		IRcore	IR(large-ap/core)	$X_{hv>20keV}$ / IRcore
S1/Li	N1097	6.5×10^{41}	700	8%
S2/RG	CenA	2×10^{42}	50	200 %
S2	Circinus	6×10^{42}	10	20%
S1	N1566	2×10^{42}	200	200 %
S2	N7582	2.5×10^{43}	20	35 %
S2	N1068	8.5×10^{43}	20	2 %
S1.9	N5506	2×10^{44}	1	5%
S1	N3783	4×10^{44}	1	15%
Qso	3C 273	9×10^{46}	1	300%

On the nearest AGN

- **AGN cores in the IR have sizes less than a few tens of pc**
- **Their SEDs are characterised by a conspicuous bump peaking in the 2-10 μm range. This bump is very step at the shortest wavelengths in type 2, but shallower in type 1.**
- **Their IR luminosities are above 80% of the total energy output ($L_{total} = L_{IR\text{-}bump} + L_{blue\text{-}bump}$ $LX_{20\text{-}100\ keV}$)**
- **Their IR luminosities can be up to several order of magnitude lower than that of their host galaxy**
- **Yet, AGN with luminosities above 10^{44} erg/s are as quasars, dominating in full the total IR light of the galaxy**