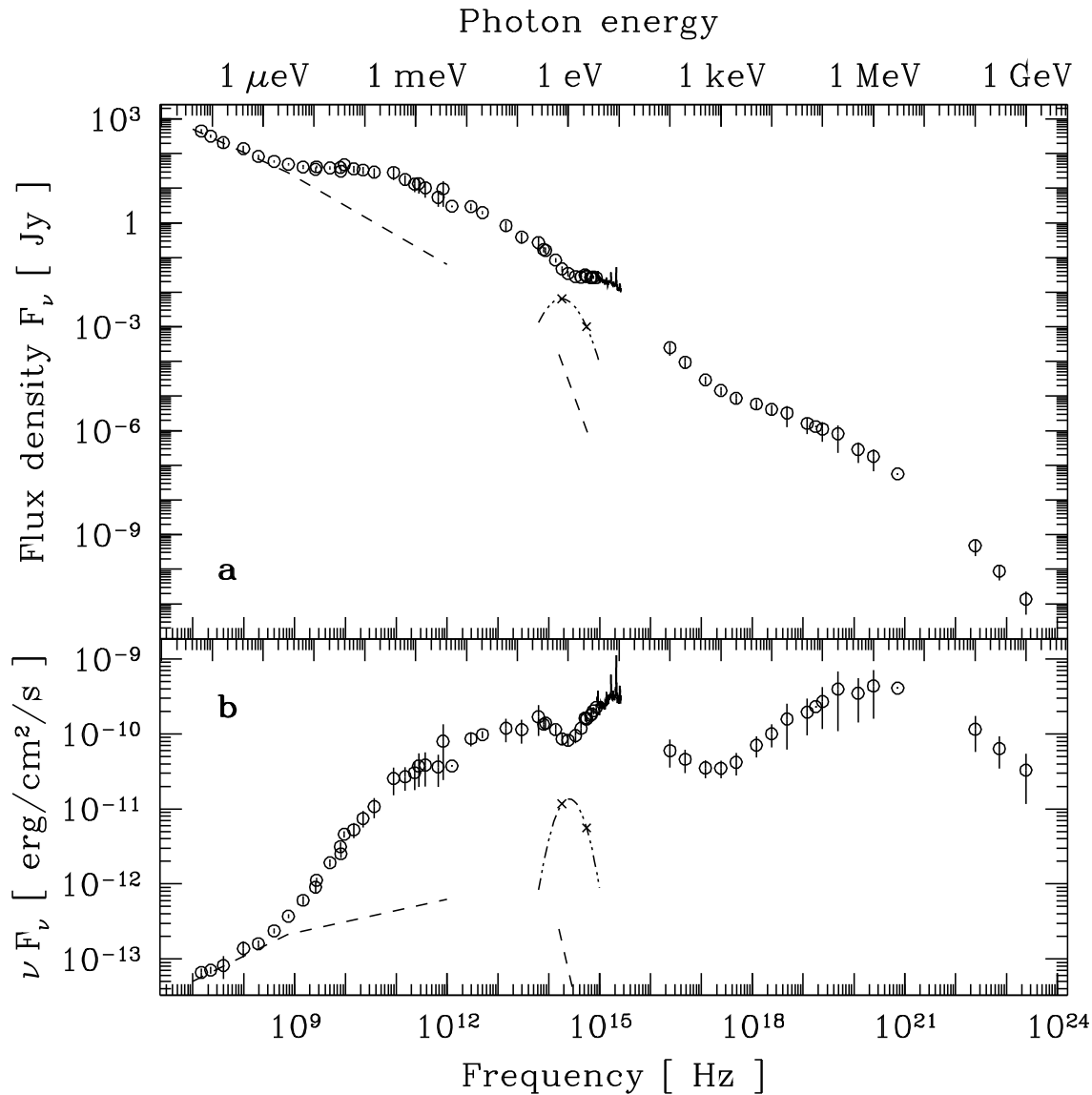


Active Galactic Nuclei

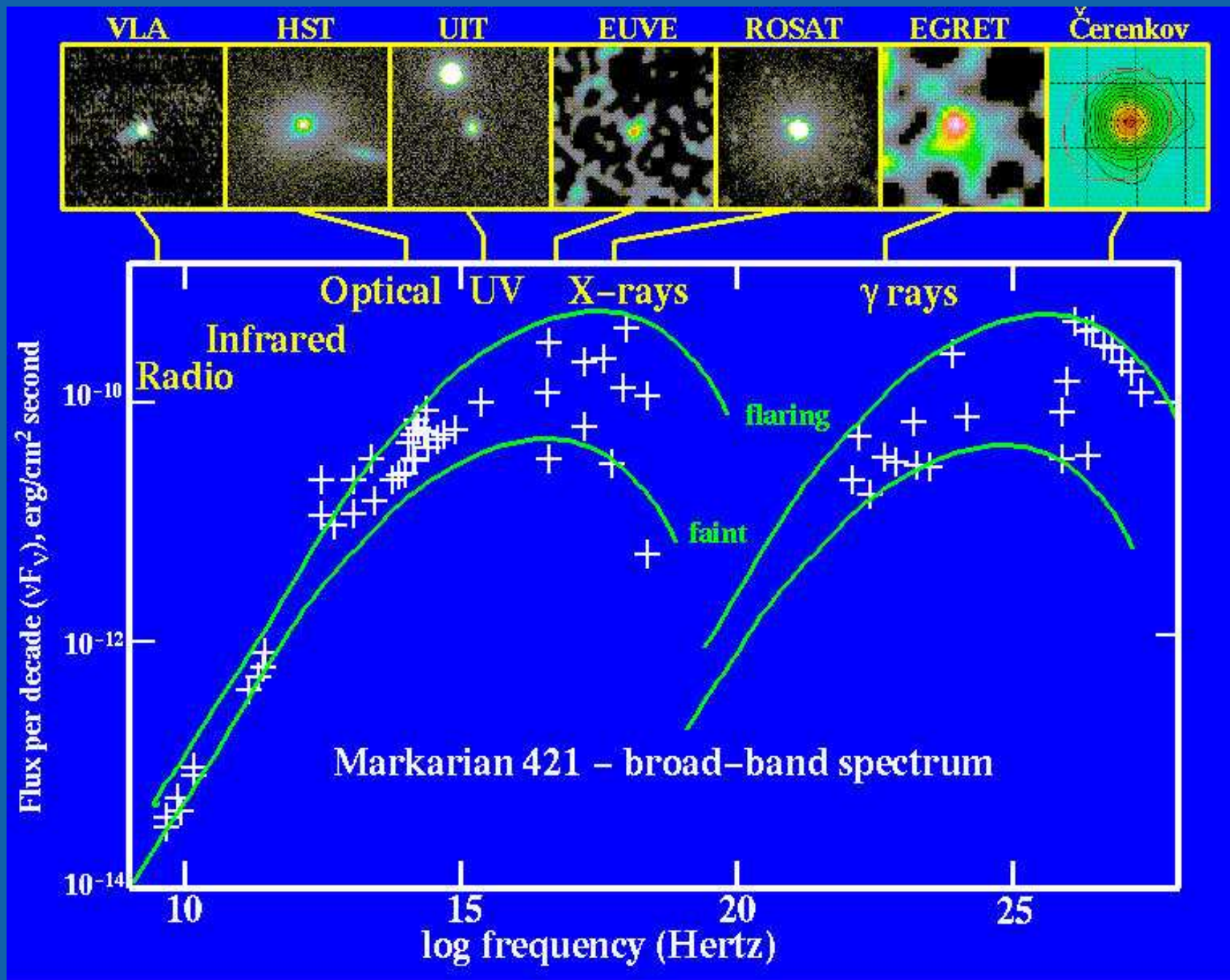
Broad Band Spectrum, I



Active Galactic Nuclei:
Emission over many
decades in energy

Türler et al. (1999): Spectral Energy
Distribution of 3C 273

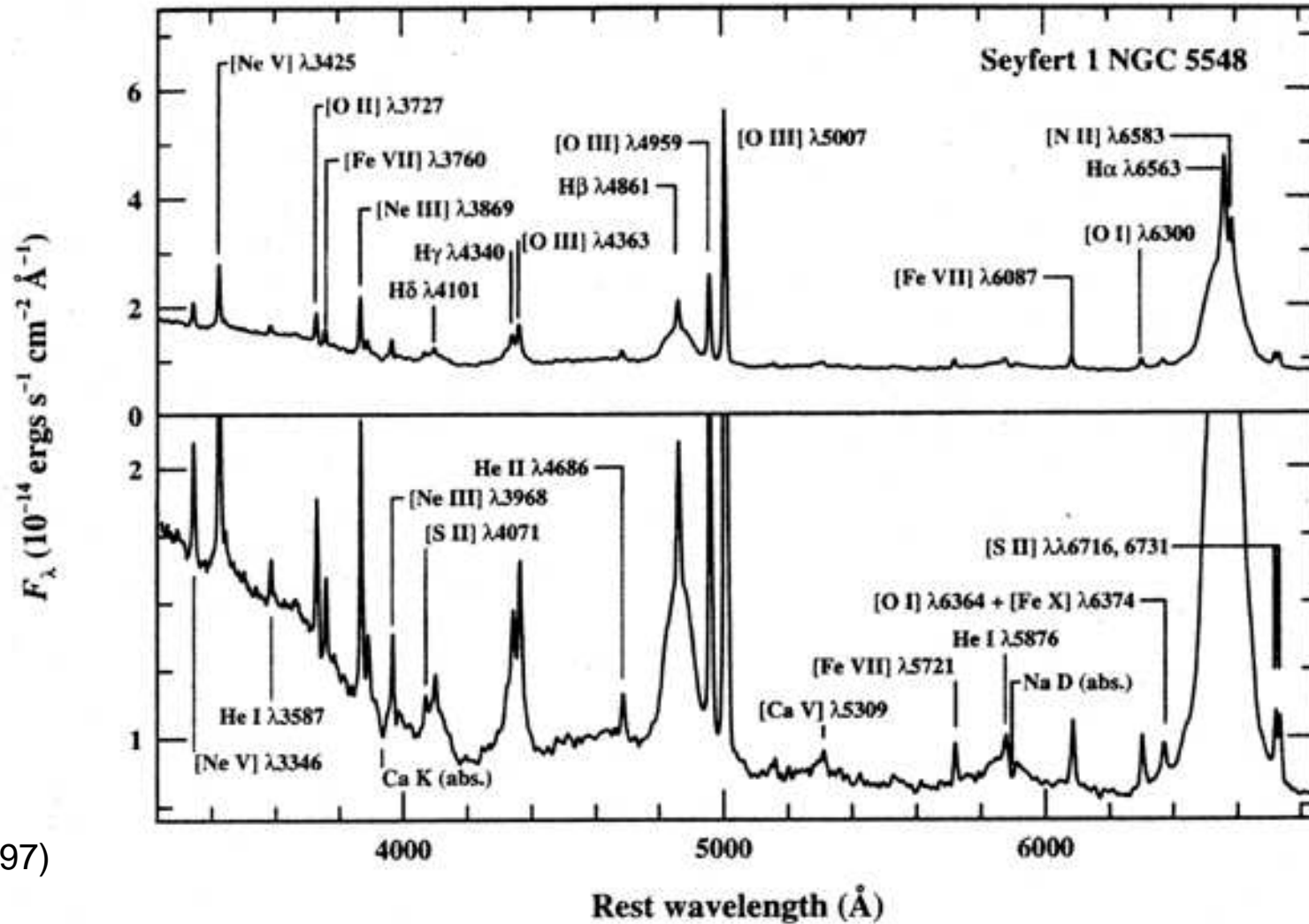
Reminder: νf_ν -plot gives energy per
frequency decade



W. Keel

Radio Loud Galaxies: General model for broad band spectral energy distribution: **Synchrotron-Self Compton radiation**

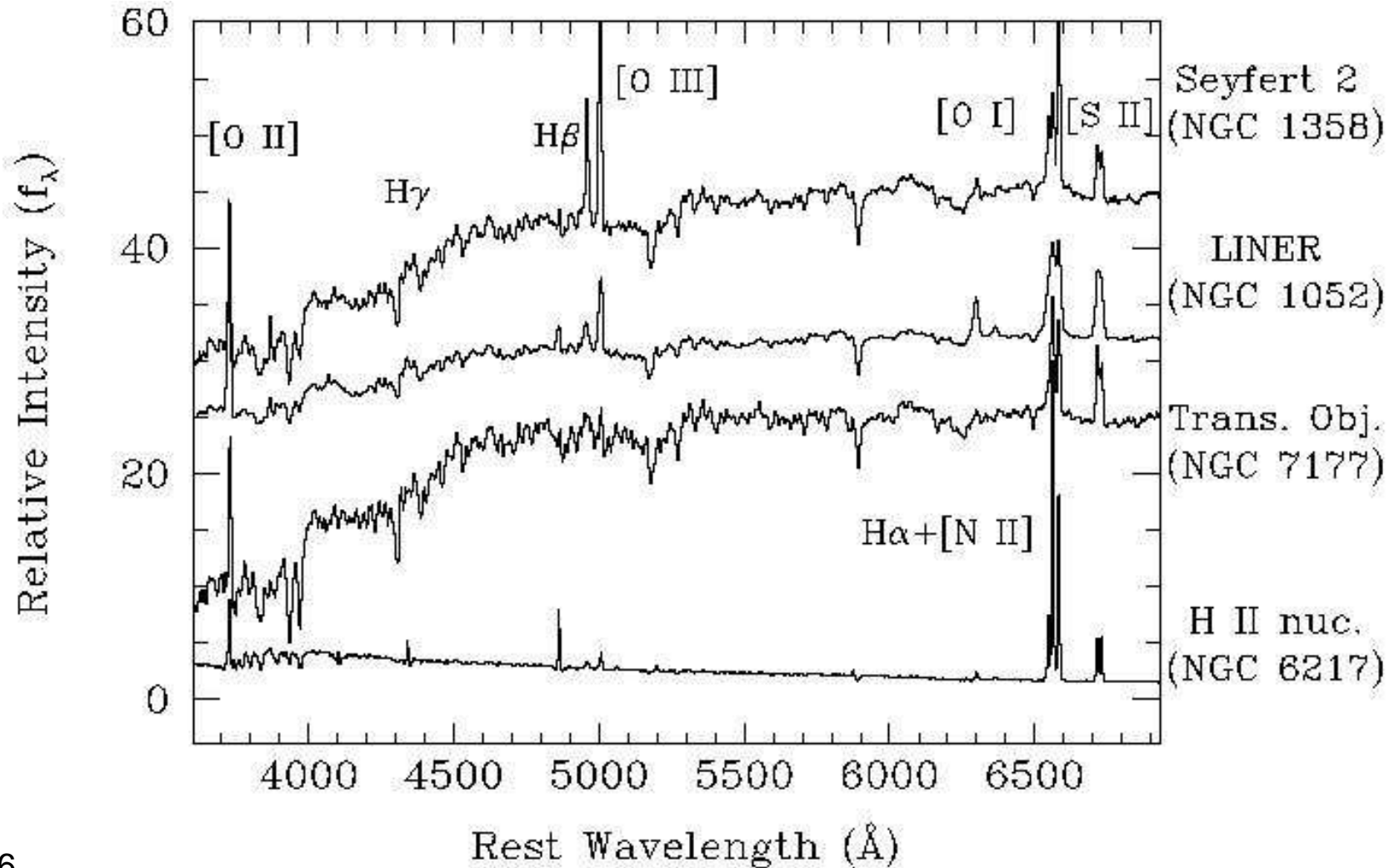
Seyfert Galaxies



Peterson (1997)

Optical/UV spectrum of NGC 5548: a **Seyfert 1 Galaxy**: broad lines!

Seyfert Galaxies



Ho, 1996

Seyfert 2 spectrum and sources with similar spectra: **narrow lines**

Seyfert Galaxies

⇒ Center of AGN is copious source of optical emission lines, lines are indicative of the presence of many elemental ionization stages

Doppler effect: Line width corresponds to velocity dispersion:

$$\frac{\Delta\lambda}{\lambda} = \frac{\Delta v}{c} \quad (10.1)$$

“radio-quiet” AGN:

- Seyfert 1:**
- strong continuum from IR to X,
 - broad allowed lines (H I, He I, He II, line width: 1000... 5000 km/s),
 - narrow forbidden lines (O III, N II, S II, line width ~ 500 km/s).

- Seyfert 2:**
- weak continuum,
 - both forbidden and allowed lines have line width ~ 500 km/s.

“forbidden lines”: emission lines caused by higher than dipole transitions (see later)

Similar behavior also for objects with jets (“radio-loud AGN”).

Classification in gory detail: Lawrence (1987), Urry & Padovani (1995)

