Active Galaxies

Distant galaxies ⇒ _____ galaxies ⇒ _____ galaxies

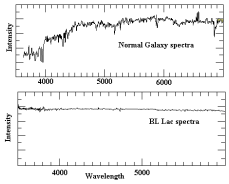
Active Galaxies

_____Energy outputs

Energy/Light of _____wavelengths

_____energy output

Active Galactic Nuclei (AGN)



BL Lacs – Blazars

– _____

– _____

Seyferts – Type I and II

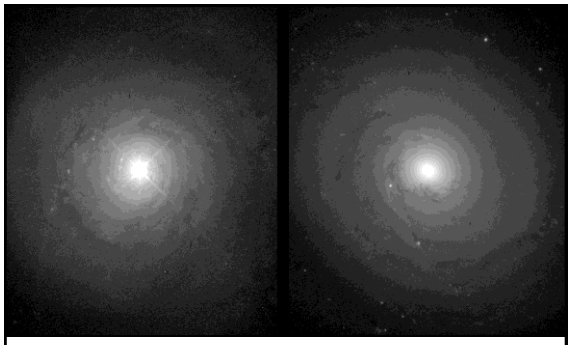
– Bright, variable core

– _____

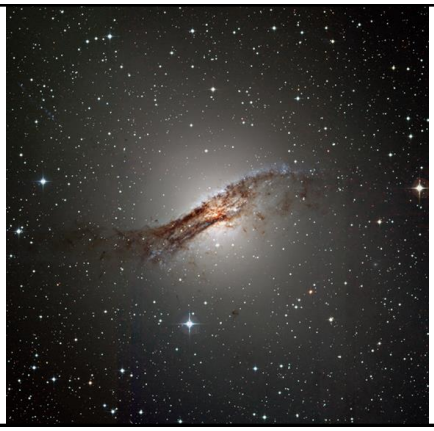
– Unusual energy output – _____

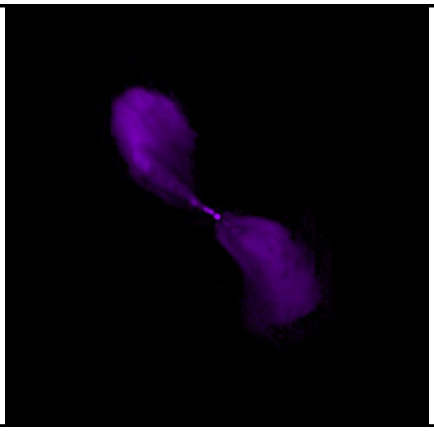
Radio Galaxies

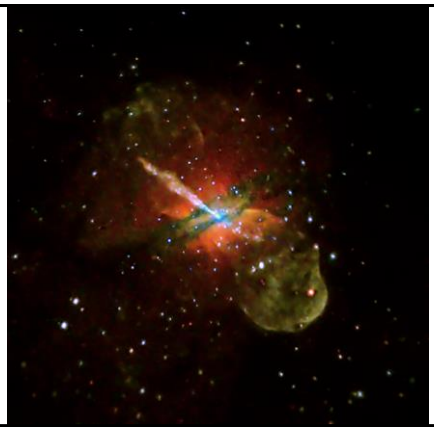
– Large amount of radio light

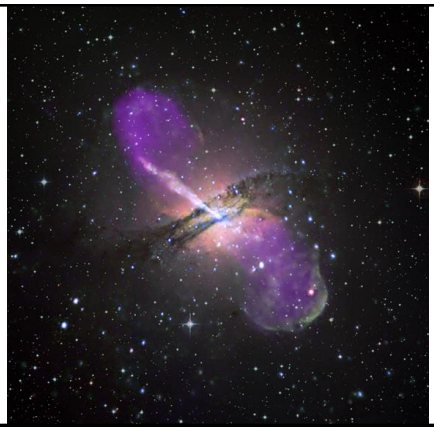


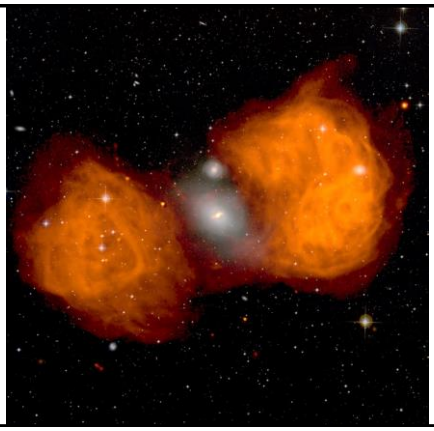
Seyfert Normal Galaxy

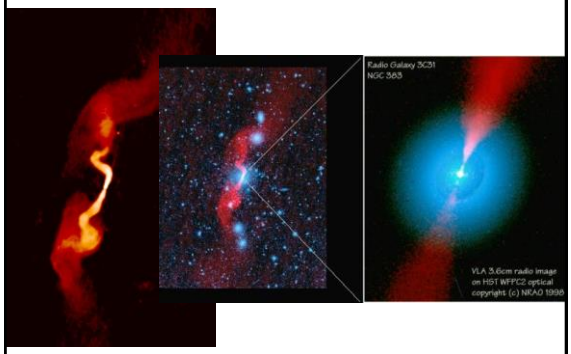






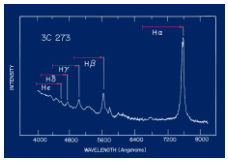


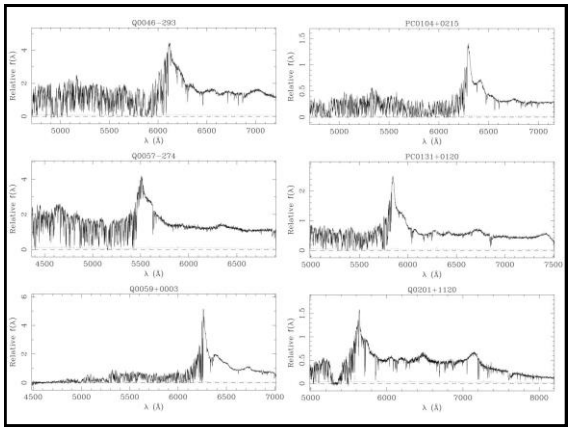



Radio Galaxy 3C31
NGC 383
VLA 3.6cm radio image
on HST WFPC2 optical
copyright (c) NRAO 1998

Quasars

Quasi-stellar objects (QSO) - Quasars
Look like stars (points)
Unusual spectra
Or is it?
High redshift - high velocity away





Quasars –

Characteristics

High redshift

_____

_____distance implied (by Hubble's law)

Not very faint ⇒ _____

Small energy source

High velocities in source

Model for Active Galaxies

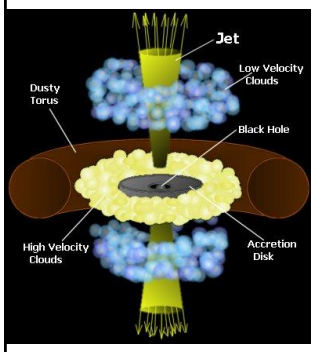
BL Lac, Seyferts, Radio Galaxies, Quasars

All different?

Or all the same?

Different models or a single model?

What would be in this model?



Black hole

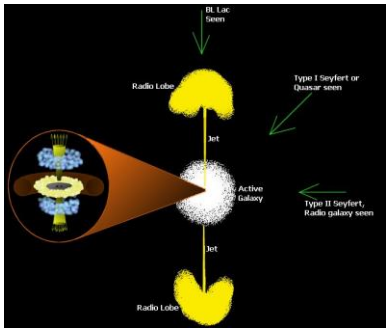
Accretion disk

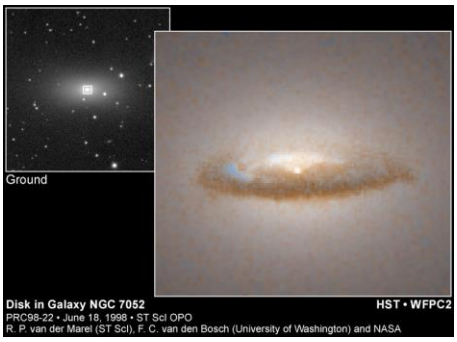
High velocity clouds

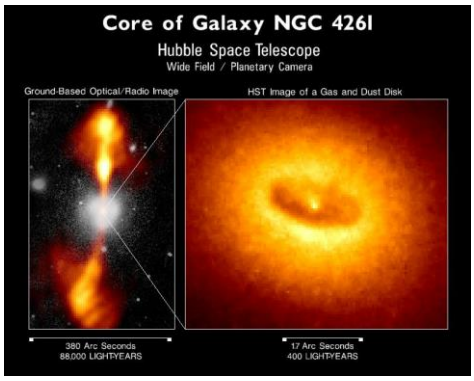
Low velocity clouds

Dusty torus (donut)

Jets

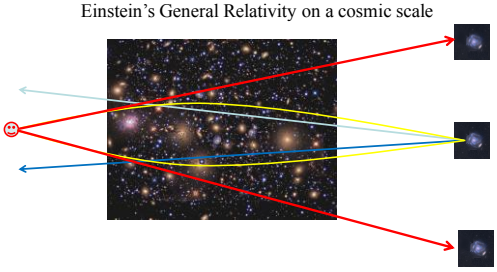

BL Lac
Seen
Radio Lobe
Type I Seyfert or
Quasar seen
Jet
Active
Galaxy
Type II Seyfert,
Radio galaxy seen
Jet
Radio Lobe

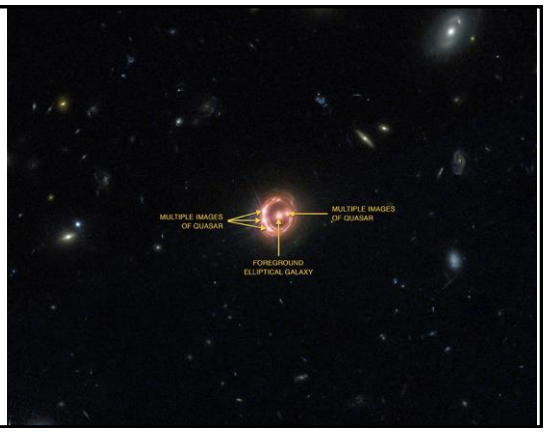

Ground
Disk in Galaxy NGC 7052
HST • WFPC2
PRC98-22 • June 18, 1998 • ST ScI OPO
R. P. van der Marel (ST ScI), F. C. van den Bosch (University of Washington) and NASA

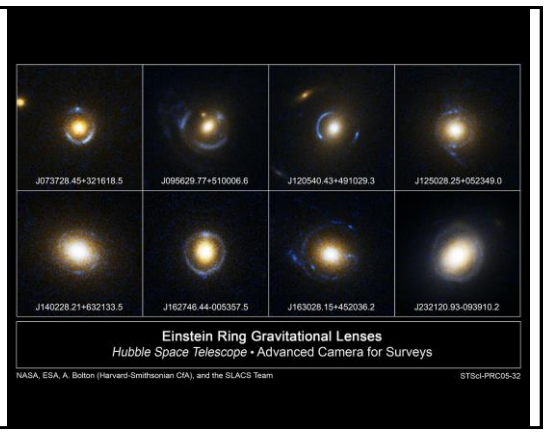

Core of Galaxy NGC 4261
Hubble Space Telescope
Wide Field / Planetary Camera
Ground-Based Optical/Radio Image
HST Image of a Gas and Dust Disk
380 Arc Seconds
88,000 LIGHTYEARS
17 Arc Seconds
400 LIGHTYEARS

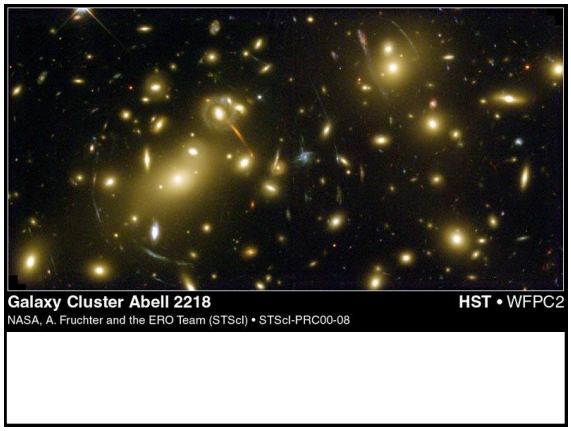
Gravitational Lensing

Einstein's General Relativity on a cosmic scale








Galaxy Cluster Abell 2218
HST • WFPC2
NASA, A. Fruchter and the ERO Team (STScI) • STScI-PRC00-08