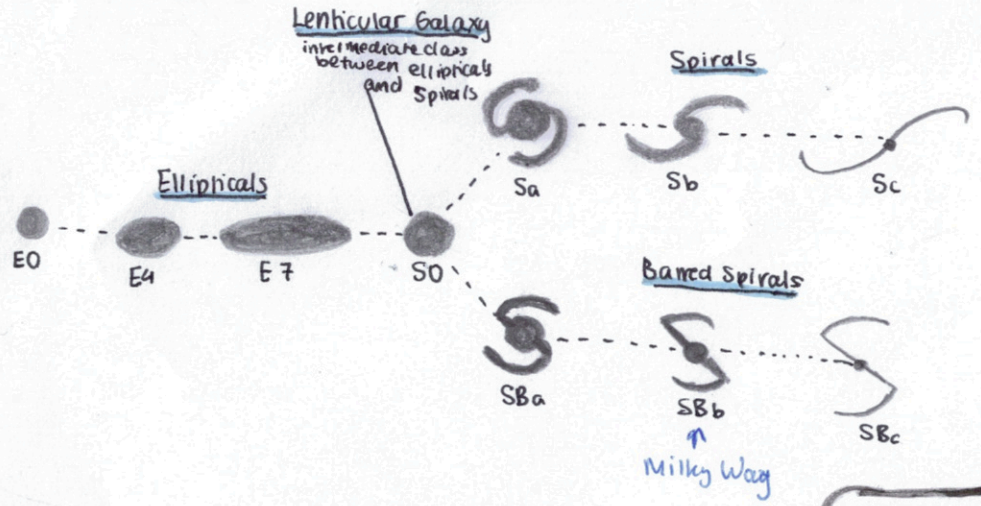
Our Place in the Galaxy

ming Fork Diagram:

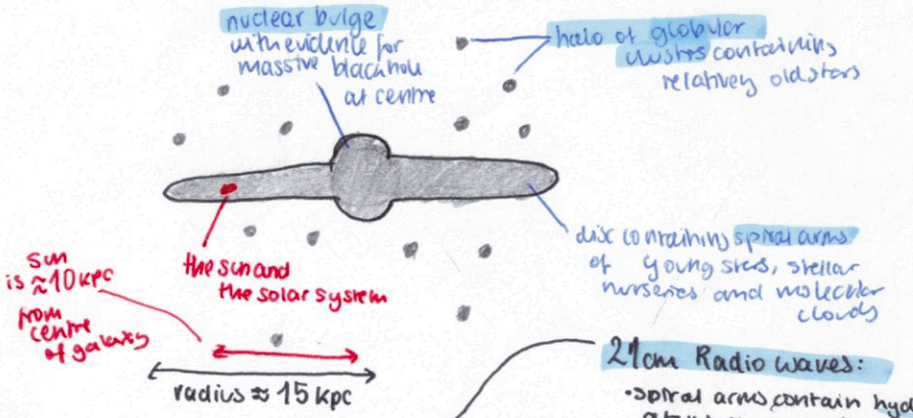


Active Galaxies:

- apart from the visible spectrum, many of these galaxies emit EM radiation from other wavebands including radio and x-ray regions
- they have an **Active Galactic Nules** powered by matter falling into supermassive blackhole and emit jets of electrons and positrons in two narrow beams at near light speeds
- 3 types:
  1. **Seyfert Galaxies** - have bright nuclei and emit strongly in IR, UV and X-ray regions
  2. **Quasars** - emit strongly in UV and X-ray regions and some are strong emitters of radio waves, appear star like on images and have large redshift
  3. **BL Lacerta Objects/Blazars** - compact qvasars in which galactic jets pointing towards us

The Milky Way appears as a **faint patchy band of light** stretching across the sky through constellations including Cassiopeia and Perseus

Milky way **from the side:**



21cm Radio Waves:

- spiral arms contain hydrogen atoms that emit radio waves
- produced when single electrons orbiting hydrogen nuclei reverse their spin
  - small loss in energy radiated as EM radiation with wavelength = 21cm
- as galaxy rotates, recieved 21-cm waves are **Doppler shifted** slightly shorter and longer
- tells astronomers how relative velocities of different parts of the Milky Way are moving and how it is rotating

Local Group - group of galaxies gravitationally bound to the Milky Way
- → about 50 galaxies
- → about 3Mpc wide
- → other members include:
  - Andromeda Galaxy
  - Triangulum Galaxy
  - LMC and SMC
  - dwarf galaxies including Phoenix Dwarf and Aquarius Dwarf

Clusters - groups of galaxies with often a large elliptical galaxy at the centre, named after the constellation that they lie in

Super Clusters - clusters may compact together under mutual gravitational attraction to form this. We are part of the Virgo Supercluster

Galaxy Formation Theories: → began ≈13bn years ago

1. Vast clouds of gas and dust collapsed gravitationally, allowing stars to form
2. Large 'lumps' of matter present in young universe. these clumped under mutual gravitational attraction to form galaxies. Earliest galaxies were probably spirals that merged to form ellipticals