**Exploring the Universe**

**What else is out there?**

**Galaxies**

* A huge collection of gas, dust, and hundreds of millions of stars.
* The stars are attracted to each other by gravity, and are in constant motion.
* Our galaxy is the Milky Way, a disc shaped galaxy with our sun located in the outer portion of the disc. There are about 100 billion stars in the Milky Way.
* The centre is called the nucleus.
* TYPES OF GALAXIES:
  1. Spiral Galaxies (ex. Whirlpool Galaxy, Milky Way)
  2. Elliptical Galaxies
  3. Irregular Galaxies (ex. Large Magellanic Cloud)

… an elliptical galaxy:

Draw a spiral galaxy:

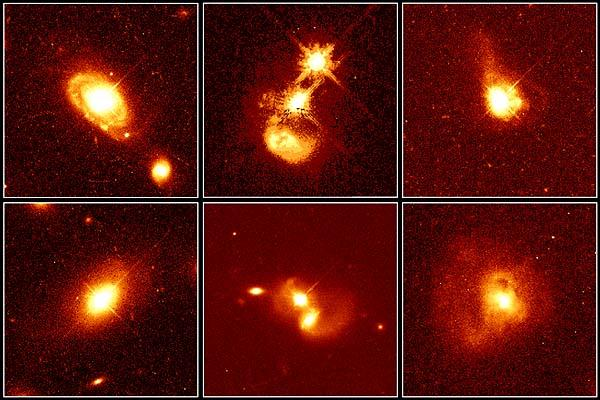
… an irregular galaxy:

**Star Clusters**

* Groups of stars that are fairly close and travel together.
* TYPES OF STAR CLUSTERS:
  1. Open Star Cluster (ex. Pleiades/Seven Sisters)
     + From 10 to 10 000 stars which are bright and close together.
     + Found in the main part of the Milky Way
  2. Globular Star Clusters (ex. Omega Centauri)
     + Contain millions of stars.
     + Outside the main part of our galaxy.

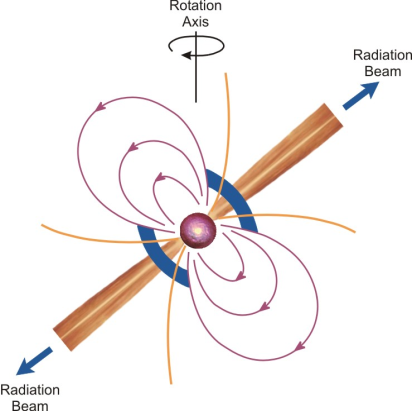
**Nebulas**

* A spread-out cloud of interstellar dust or gas.
* Can often see them with the unaided eye, and are spectacular when viewed with a telescope.
* TYPES OF NEBULAS:
  1. Bright Nebulas (ex. Trifid Nebula)
     + Either give off light energy (pinkish colour) or reflects light from nearby stars (blue or violet colour)
  2. Dark Nebulas (ex. Horsehead Nebula)
     + Composed mostly of dust
     + Dust blocks out the light from stars (or bright nebulas) behind them
     + Appear as dark patches in the sky

**Quasars**

* QUASi-stellAR objects (or quasi-stellar radio sources)
* Neither galaxies nor stars
* Emit radio waves
* The oldest, most distant, and most powerful sources of energy in the universe.

**Pulsars**

* Spinning neutron stars
* Send out pulses of radio waves, we only detect the waves when the pulsar is facing towards us.
* Small, dense, rotating objects that emit radio waves
* Not visible, even with a good telescope.

**Black Holes**

* Extremely small, dense core of a star
* Very strong gravity, even light cannot escape (hence the name)
* As nearby material falls into the black hole it emits X-rays. We have detected X-ray sources that we believe are caused by black holes

