

Galaxy Questions

1. What does an object need to have in order to be defined as a galaxy (as opposed to, say, a globular cluster)?

Note It might seem to make sense to define a galaxy as having a supermassive black hole at its core (although this is not how a galaxy is defined!). So I looked online for the smallest known galaxy to have a black hole at its core. The main response was a research article from 2014 regarding the observation by the Hubble telescope of the ultra-compact dwarf galaxy M60-UCD1.

I was surprised that this is shown in Stellarium as a custom object. A challenge would be to locate this object near M 60. Its magnitude is 15.942 (according to information on Wikipedia!)

2. How close together do the cores of two galaxies have to be in order for these galaxies to be regarded as interacting?

Note The distance of the Andromeda Galaxy is generally quoted as around 2.5 million lightyears. The galaxy Centaurus A has been quoted as being between 10 - 16 million lightyears (a large range!). In some cases where Stellarium shows two interacting galaxies, the distance between the two cores is far more than 2.5 million lightyears. Presumably this is due to the difficulty in pinpointing an accurate distance measurement but why would they quote the distances between the cores as being so large?

3. I was inspired to compile a database of 10,000 galaxies by the 50th Anniversary of SDAS.

What is significant is the sheer number of different galaxy descriptions used by Stellarium (510 recorded, in fact!)

I looked this up online and found the [Hubble-de Vaucouleurs diagram](#) which is an extension of the basic Hubble diagram. However, it did not cover all the descriptions.

So the question is, "Which catalogue does Stellarium (or other major planetarium software) use to describe galaxy type?"

4. Stellarium quotes an orientation angle for each galaxy which ranges from 0° to 180°.

Which rotation axis does this refer to and what is the direction of orientation relative to this axis?

5. It is rapidly becoming apparent to me that one of the most vital skills for astronomy enthusiasts is to be able to extract and accurately apply data from databases such as the Gaia database.

So the question is, "Are there any tutorials delivered via the Outreach programme to help people learn how to access and apply such data?"

(For example, there are huge variations in the distances of some stars from Earth depending on the data source. So it would help to get this information from a reliable source.)

One of the tests of the galaxies database that I created was to list, in order of ascending distance, the nearest galaxies to Earth. Such an apparently straightforward exercise but fraught with ambiguities and it demonstrates the need for reliable information.

For example, which galaxy is nearest to Earth, Sextans A or Sextans B?

According to the [List of Nearby Galaxies](#) on Wikipedia the distance of Sextans A is given as 4.31 million lightyears whereas the distance of Sextans B is given as 4.44 million lightyears. However, according to Stellarium, the distance of Sextans A is 4.661 million lightyears which would make it further away than Sextans B!

Incidentally, the [List of Nearby Galaxies](#) on Wikipedia comprises 202 galaxies and the Large Magellanic Cloud (listed as the 19th nearest! Is the first one to be listed on Stellarium. The Canis Major Dwarf Galaxy is listed as the nearest galaxy by Wikipedia although its status as a galaxy is apparently disputed (refer to question 1).

6. What is the current consensus as to the origin of super-massive black holes? (Is there any recent research which suggests a different origin?)