

Astronomy Talk 12th June 2018

Quasars

Nick Higginbottom from Southampton University came to talk about this subject.

First we looked at radio astronomy, and covered some of its history from Jansky, Reber and the Cambridge group leading to the 3C catalogue, which listed many quasars.

Nick then talked about spectra, with a tidy demonstration showing the difference between hydrogen and helium lines. He showed how 3C273's spectrum was highly red shifted, with a recession velocity of $.16c$.

We then looked at distance measurement, from parallax to Cepheids, and on to Type Ia supernovae and cosmological shift. It turns out 3C273 is about 2.5 billion light years away, which must imply it's extremely bright.

Energy was the next subject. Quasars are typically as bright as 100 galaxies. We looked at energy sources from coal to nuclear fusion, and none of these was sufficient. The absorption of 2 solar masses per annum by a black hole, releasing the stars' gravitational potential energy as they fall in via an accretion disc, can account for the energy observed. Up to 50% of the rest mass absorbed can be converted into energy.

Lastly, Nick talked about the current lack of quasars. They started when the universe was about 20% of its current age, peaked at about 30% and dropped off around 60% to 70%. It's though they have cleaned up their neighbourhoods so that there's not much left to absorb.