The Environments of Hot and Cold Accretors

Authors: John H.Y. Ching1, Scott M. Croom1, Elaine M. Sadler1, the WiggleZ team and the GAMA team
1Sydney Institute for Astronomy (SIfA), The University of Sydney
Contact: j.ching@physics.usyd.edu.au

What are hot and cold mode accretors?

Current observations (Best et al., 2005; Hardcastle et al. 2007) suggest that there are two different modes by which radio-loud AGNs accrete material into their central black hole, a hot and a cold mode. See Figure 1 for example of spectra of hot and cold mode accretors. See Figure 1 for example spectra from visual classification of different radio-loud AGN.

Hot Mode
- slow accretion of gas.
- not able to form an efficient accretion disk.
- no high-excitation emission lines.

Cold Mode
- accretes gas rapidly.
- forms a radiatively efficient accretion disk.
- presence of high-excitation emission.

Q: Do hot and cold mode accretors live in different environments?

It is believed that hot mode accretors are commonly found in dense environments, because the virial temperature of the group is sufficiently high such that the cooling times of gas is quite large (Croton et al. 2006; Bower 2006), whereas cold mode accretors are believed to lie in lower density environments. To test this we compare the environments of hot and cold mode radio galaxies in the GAMA and WiggleZ redshift survey.

A: YES! The FoF and $D_5$ both show that:

- hot mode objects are largely found in groups that tend to have high surface densities.
- cold mode objects live in low density environments similar to their non-radio counterparts.


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