**Assignment05**

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For this debate, I choose topic (A), (E) and (F), the paragraphs below are the introduction of three topics.

**A) Cold dark matter is incompatible with structure on galactic scales**

CDM model is the most popular cosmology model. Although it fits the observation well in large scale. But CDM model has some problems in structure on galactic scales. One question of CDM model is that, in simulations, there are too many small DM halos or satellite galaxies around MW compare our observation. Although after SDSS more ultra-faint Milky Way satellites have been found, satellites around the Milky Way are still a factor of about 4 too few to compare with the CDM model. But there are still unconfirmed because other mechanism like reionization is not considered yet. The other question is that the DM density in small scale doesn’t fit the speed curve of galaxies. PI model from observation tells us there is a DM core in the center of the galaxy but NFW model from the CDM simulation tells us there is a “cusp”. Although many people try to fit the model with observation, the data from all disk galaxies and LSB galaxies did not support the CDM model yet.

**E) AGN feedback is the main process that quenches massive galaxies and keeps them quenched.**

In observation we have seen many galaxies have quenched, but we haven’t found the main process to quench the galaxy. An active nucleus interacts with the gas in its host galaxy through radiation pressure, winds, and jets, which will heat the hot intracluster gas and reduces radiative cooling and subsequent star formation by an order of magnitude. Also, AGN has clearly enough energy and momentum produced by the nucleus to expel the interstellar medium of the host galaxy. What’s more, there are observations which find that the hosts of low-redshift AGN are mainly on the red sequence or on the top of the blue cloud. So many people think mainly merging or other reason to cause AGN is the main process that quenches massive galaxies, while in some simulations, galaxies may be quenched by other mechanism including smooth accretion, or minor mergers

other simulation shows some quenching galaxies without major mergers or AGNs.

**F) Minor mergers are the primary mechanism for the size evolution of early-type galaxies since z=2.**

In observation, although we have some systematic uncertainties, it is found that the galaxies has become bigger since z=2. But so far we do not have a certainty model to explain the observation. Most people think that minor merger is the main mechanism, while some people think that major merger or dry merger is the main mechanism, others would think the main mechanism is different though the evolution. It is interesting to found what is the main mechanism by more high-accuracy observation or simulation.