

国台学术报告 NAOC COLLOQUIUM

2013 年 第 48 次 / Number 48, 2013

TIME: Thursday, 2:30 PM, August 29, 2013 **LOCATION: A601 NAOC**

The morphological origin and transformation of dwarf galaxies



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Abstract

Because of their morphological appearance dwarf galaxies (DGs) have been tried to be also classified according in analogy to the massive Hubble-type galaxies. Comprehensive and detailed studies of DGs, however, have spotted a much larger variety and complexity of their substructures to exist and much stronger environmental effects to act continuously on their evolution.

From the predictions of CDM cosmology the baryonic portion of DGs has formed at first within dark matter subhalos and have hierarchically fed the major galaxies. Since DGs, however, are very sensitive to energetic influences, they have not at all reached their morphological destinations, but undergo morphological transitions. Their low gravitational potential allows strong influences of internal effects, as e.g. starburst-driven galactic mass loss as well as environmental influences, exerted e.g. in galaxy clusters.

This talk will shed light on a variety of evolutionary effects of DGs from their possible birth path in tidal tails of merger galaxies to changes of their shape and morphology as being observable:

1. Whether tidal DGs can contribute a significant fraction of the present-day DG population depends on their survival probability. On the other hand, TDGs are expected to be void of dark matter.
2. Since the enhanced star formation in some DGs seem to be triggered by gas accretion, but on the other hand leading to strong galactic outflows, the interaction of gas infall vs. outflow has to be studied in detail in order to understand DG evolution.
3. Ram pressure by intergalactic gas can evacuate the gas content from DGs and transform them morphologically.
4. A system of satellite DGs evolves much different from single DGs in the field due to tides of the central galaxy and the mutual interactions of the satellites themselves.

