



Report from the event supported by RadioNet

TITLE *GALAXY INTERACTIONS AND MERGERS ACROSS COSMIC TIME*

DATE: *11TH – 16TH MARCH 2018*

LOCATION: *SEXTEN, ITALY*

MEETING WEBPAGE: *<http://www.sexten-cfa.eu/de/kongresse/2018/details/93-galaxy-interactions-and-mergers-across-cosmic-time.html>*

HOST INSTITUTE: *SEXTEN CENTER FOR ASTROPHYSICS, ITALY*

**RADIONET
BENEFICIARY / NO:** *ESO/13*

Report:

1. SCIENTIFIC SUMMARY

Event webpage:

<http://www.sexten-cfa.eu/en/conferences/2018/details/93-galaxy-interactions-and-mergers-across-cosmic-time.html>

The main goal of the workshop was to approach the study of galaxy interactions and mergers from complementary perspectives, catalyzing discussions among experts working on different redshifts, techniques and wavelengths, and to foster synergies between observers and theorists. We believe that the workshop helped raising awareness on the importance of combining these perspectives in order to build a complete picture of this fundamental phenomenon, and identifying the most fruitful instrumental avenues to explore in the near future.

We started the workshop studying the impact of mergers on the assembly history of galaxies. This included the important question of identifying merger signatures (both observationally and in simulations), and the delicate issue of their observability. The role of the varying merger timescales as a function of redshift, and its impact on the calculation of merger rates, was thoroughly discussed.

We then moved on to the field of mergers as triggers of star formation. Agreement seems to exist in the local Universe regarding the fact that mergers trigger enhanced star formation at the first pericentre passage, and even more so when coalescence occurs; a similar enhancement of star formation at high redshift has been questioned by simulations, however, provided that the gas content is already very high and some saturation seems to occur. Results using RadioNet facilities such as ALMA and the IRAM 30m telescope were highlighted by several talks in this session; access to observations of cold molecular gas, the fuel for star formation, are crucial in order to disentangle the effect of mergers on star formation, and specifically to identify what properties affect the star formation *efficiency*.

Our workshop also tackled the role of mergers in triggering AGN. While significant efforts have been devoted to this topic, both observationally and from the numerical point of view, it seems particularly hard to find consensus on how strongly mergers can affect nuclear activity. This might be related to the stochasticity of the accretion process, the differences of AGN detectability as a function of wavelength, and the observational difficulty to identify appropriate control samples. While it seems clear that statistically mergers do trigger some enhancement of nuclear activity, it does not seem like a high fraction of active galaxies are necessarily currently interacting or merging.

Finally, we considered the impact of mergers on morphology, dynamics, and chemistry. Recent numerical simulations have demonstrated that major mergers of gas-rich disk galaxies do often result in another disk galaxy (often a spiral), and not necessarily in elliptical galaxies, as traditionally assumed; the disks are initially destroyed but quickly afterwards rebuilt from the gaseous debris of the collision. Access to reliable velocity fields (from HI or CO, via facilities associated with RadioNet) were highlighted as critical to identify the orbital characteristics of mergers via detailed dynamical modelling.

2. AGENDA OF THE EVENT

Please see attached PDF for the programme.

3. PARTICIPANTS

The workshop was attended by 44 participants, with the following breakdown:

- home affiliation in Europe (25/44 or 57%), North America (14/44 or 32%), and others (5/44 or 11%) from Australia, Chile, China and Taiwan.
- 20/44 (45%) are junior researchers including post-doctoral researchers and PhD students, while 24/44 (55%) are senior researchers with permanent positions.
- 15 female (34%) and 29 male (66%), representative of the gender ratio in the field of galaxy evolution.
- All participants were invited to give a talk. Only two senior researchers opted out and led discussions instead.

The conference picture is attached below.



4. RADIO NET FINANCIAL CONTRIBUTION

We have been approved 2000 EUR of financial support from RadioNet for the event, which were allocated to 5 participants (users of RadioNet facilities).

5. PUBLICATIONS

Noted.