

Evolution of cosmic structures: stars, galaxies and the cosmic web

List of topics:

Evolution of galaxies (Lecturer: Dr Darko Donevski)

10 lectures in 3 blocks (~2.5h each)

(1 block weekly)

Proposed dates: March 06 /13/ 20

** I am almost entirely unavailable during the second half of April, May and second half of June*

1. Galaxy formation (I): ingredients and timescales
2. Galaxy formation (II) cosmic backgrounds
3. Galaxy formation (III) cosmological simulations of galaxy formation

4. Statistical properties of galaxies (I): star-formation scaling relations
5. Statistical properties of galaxies (II): tracers of interstellar medium
6. Statistical properties of galaxies (III): spectral modeling

7. Galaxy evolution (I): multiwavelength perspective
8. Galaxy evolution (II): physical properties within the large-scale structure
9. Galaxy evolution (III): observational challenges
10. Galaxy evolution (iV): theoretical challenges

References:

Mo, Bosch, White - Galaxy Formation and Evolution

Hodge & da Cunha - High redshift star-formation in the ALMA era

Somerville & Dave - Physical models of galaxy formation in the cosmological framework

Maiolino & Mannucci - The chemical evolution of galaxies

Stellar evolution (Lecturer: Dr Miguel Figueira)

Probably 1 to 2hrs weekly

Proposed dates: April/May

1. The interstellar medium
2. Stars and stellar evolution
3. Impact of stellar feedback on the ISM
4. The initial mass function

5. Extragalactic star formation
6. Population III stars

Cosmic Web (Lecturer: Dr Anna Pearson)

Preferably 1h/weekly or 2h/biweekly

May/June

1. General background: Filaments, nodes, and voids
2. The two-point correlation function
3. Halo occupation distribution modeling
4. The dependence of clustering on galaxy properties
5. Galaxy bias and dark matter halo masses
6. Using clustering to study galaxy evolution
7.

References:

Schneider, P., 2015: Extragalactic Astronomy and Cosmology (chap. 7 and 8).

Peebles, 1980: The large-scale structure of the universe.

Padmanabhan, T., 1993: Structure formation in the universe.

Coil, A., 2012: Large Scale Structure of the Universe, <https://arxiv.org/abs/1202.6633>