

Discussione – star formation

- A. Unirsi a fare massa critica
- B. Coinvolgimento teorici
- C. Confluire in poche key – questions
- D. Cross-talk col resto della MA2
- E. Facilities

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1. Come si distribuisce globalmente la formazione stellare nella galassia ?

Formazione strutture, distribuzione filamenti, turbolenza, campi magnetici su grande scala, astrochimica

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2. Quale fisica guida la formazione del singolo oggetto alle varie masse ?

Collasso, evoluzione momento angolare, jet generation, accretion/ejection, astrochimica, campi magnetici su piccola scala

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3. Quali elementi portano alle condizioni iniziali della formazione planetaria ?

Struttura dei dischi, evoluzione di gas e polvere, jet feedback, astrochimica, campi magnetici, irraggiamento

Galactic archeology

Possible Key questions:

Structure formation on sub-galactic scales in the MW Lab and in the Local Volume (including DM mapping)

Chemo-dynamical evolution on different scales: from clusters to galaxies.

Star Formation History of the investigated stellar systems (both resolved and non resolved stellar populations)

Synergies:

Asteroseismology, stellar evolution, classical pulsating stars

Galactic archeology

Instruments:

GAIA, WEAVE, PLATO, MOONS, LBT, E-ELT
(4MOST, LSST, JWST, WFIRST, ATLAST)

Distance scale and transients

Possible Key questions:

How to derive accurate distances, 3D maps and properties of the stellar pop in galaxies from pulsating stars?

What is the role of the new discovered types of stellar explosions (including Super Luminous SN) as distance indicators

How to reconcile H_0 from distance determinations (from primary to secondary distance indicators) with CMB results?

Related problems:

What are the optical counterparts of gravitational waves?

What is the correct gravity?

Distance scale and transients

Instruments:

GAIA, HST, VISTA, TNG, VST, LBT, PLATO, E-ELT
(LSST, JWST)

Per i transienti SOXS@NTT, NTE@NOT

Extrasolar Planetary Systems

Possible Key questions:

What are the architecture and dynamics of planetary systems across orders of magnitude in mass, radius, and separation?

What are the structural properties and atmospheric chemistry and dynamics of planetary systems across the same ranges?

How do planetary properties depend on the characteristics (age, mass, metallicity) of the host stars?

Related problems:

How does stellar activity and evolution affect planetary systems?

How does star formation affect the initial conditions for planetary systems?

How is habitability affected by all of the above?

Extrasolar Planetary Systems

Instruments:

HST, Gaia, TNG/GIARPS, (HARPS+NIRPS), SPHERE, (GPI), LBT/PEPSI, ESPRESSO, (HARPS3, ESPRESSO-N), Other IR Spectrographs, LBT/SHARK(s), CRIRES+, (TESS), SIOUX (?), CHEOPS, JWST, PLATO, ARIEL (?), Theia (?), E-ELT/HIRES/(METIS)/PCS, (WFIRST), you name it!

Missing Ingredients (at INAF?):

- More advanced interpretative tools (data analysis, formation, atmospheric, and evolution models)
- Laboratory work