Fifth Workshop on Millimetre Astronomy in Italy Discussion on Galactic Science

Main star formation Science Drivers in the next years

- 1. Large-scale, Galactic wide studies in order to derive general rules for star formation that can be used also as template for other galaxies
- 2. Role of environment in influencing/determining the properties of the forming stars
- 3. **Impact of multiplicity** in the star formation process (most of the stars form in a multiple system or a cluster)
- 4. Astrochemistry and origins of chemical complexity in low and high mass prestellar cores/clumps, protostars and disks
- 5. Molecular emission as tool to study **fragmentation and feeding mechanism** at all scales: from molecular clouds, to filaments, clumps, cores and protostellar disk
- 6. Others?

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Present and near future (sub-)millimeter facilities

SRT Sardinia Radio Telescope
AtLAst Atacama Large Aperture Submillimeter Telescope is a concept for a next generation 50-meter class single-dish astronomical observatory operating at submillimeter and millimeter wavelengths
ALMA Atacama Large mm/submm Array
MeerKAT SKA precursor
SKA Square Kilometre Array

- Can the Italian community actively contribute to the development/upgrade of these facilities? In which way?
- What do we need, as a community, to be effective in fully exploiting present and future mm-telescopes?
- What are the large projects that we can lead?
- For galactic science, what are the most promising synergies of current and future facilities in mm and sub-mm bands with those in other bands?

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ALMA updates



Band I 35-50 GHz March 2024 Band 2 67-116 GHz future.. Broaden the receiver IF bandwidth by at least a factor of two and to upgrade the associated electronics and correlator to process the entire bandwidth

"The ALMA development program: roadmap to 2030", Carpenter et al. 2020,

Key science goals: Origins of Galaxies, Origins of chemical complexity, Origins of planets

Activity	SKA-LOW		SKA-MID	
	Date	Number of stations	Date	Number of dishes
Start of Construction	Jul 2021		Jul 2021	
Start of major contracts	Aug 2021		Aug 2021	
Finish of Array Assembly 0.5 (AA0.5)	Feb 2024	6	Mar 2024	4
Finish of AA1	Feb 2025	18	Feb 2025	8
Finish of AA2	Feb 2026	64	Dec 2025	64
Finish of AA*	Feb 2027	307	Jun 2026	144
Finish of AA4	Nov 2027	512	Jun 2027	197

SKA updates **SKAO**

Cradle of Life Our Galaxy HI Galaxy Science

SKA Low 50-350 MHz SKA Mid 350 MHz-15.4 GHz

Construction starts July 2021 - end 2030

~50-70% time allocated to key science projects (large programs) led by SKA-member countries

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New projects & related PhD, Postdoc positions