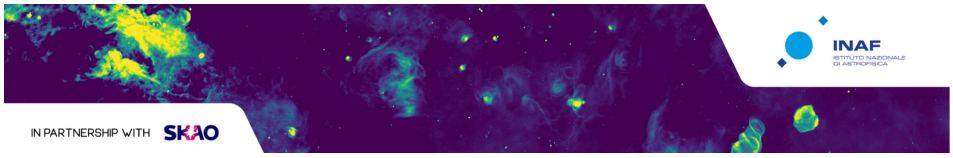

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The ionised Milky Way: the SKA survey of the continuum radio in the Galactic Plane

Tuesday 25 November 2025 17:45 (15 minutes)

Our Milky Way is a unique laboratory to investigate the (massive) star formation mechanisms with a detail that cannot be reached in any other galaxy. These multi-scale processes are regulated by a complex interplay between gravity, turbulence and feedback which vary from region to region. Large surveys of the Galactic Plane (GP) have been proved as a particularly powerful tool to investigate such mechanisms on a statistically significant sample of objects in different environments. GP surveys in the FIR/sub-mm with Herschel revealed and characterized hundreds of thousands of parsec-scales clumps. In combination with surveys of dense gas tracers such as MALT90 or SEDIGISM we were able to characterize the dynamics of hundreds of these objects across the Galaxy. Thanks to recent surveys performed with ALMA we were now able to observe a thousand of star-forming clumps at ~1500AU resolution, revealing how the fragmentation properties may vary across different Galactic environments. What is still missing to get a more complete picture of the star-formation process is to understand the feedback mechanisms in various star-forming complexes.

SKA-Mid will provide for the first time the opportunity to map the continuum emission from the ionised gas with unprecedented sensitivity and angular resolution in a large portion of the GP. These data will provide the basis to estimate the radio emission associated with jets, outflows and expanding HII regions, the main feedback mechanisms in place in young protoclusters.

This SKA project combined with ancillary GP surveys will enable a first comprehensive picture of the interplay between gravity, turbulence and feedback across various environments of our Galaxy in thousands of massive regions. Such survey will have a legacy value for years to come, by providing at the same time a unique database of radio continuum emission associated with newly forming HII regions, large-scale radio filaments, supernovae expanding shells and planetary nebulae. We will finally discuss how the capabilities of the AA* and AA4 configurations will guarantee surveys of the GP able to reach the weakest star-forming regions at more than 10 kpc away from us.

Topics

Cradle of Life & Our Galaxy

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