
Ionisation and synchrotron emission by cosmic rays: two sides of the same coin

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Résumé

In recent years, exciting developments have taken place in the identification of the role of cosmic rays in star-forming environments. Observations from radio to infrared wavelengths and theoretical modelling have shown that low-energy cosmic rays (< 1 TeV) play a fundamental role in shaping the chemical richness of the interstellar medium, determining the dynamical evolution of molecular clouds. I will summarise in a coherent picture the main results obtained by observations and by theoretical models of propagation and generation of cosmic rays, from the smallest scales of protostars and circumstellar discs, to young stellar clusters, up to Galactic scales. I will also discuss new fields that will be explored in the near future thanks to new generation instruments, such as: SKA and its precursors, for the synchrotron emission; JWST for the estimate of the cosmic-ray ionisation rate; CTA, for the γ -ray emission from high-mass protostars.

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