

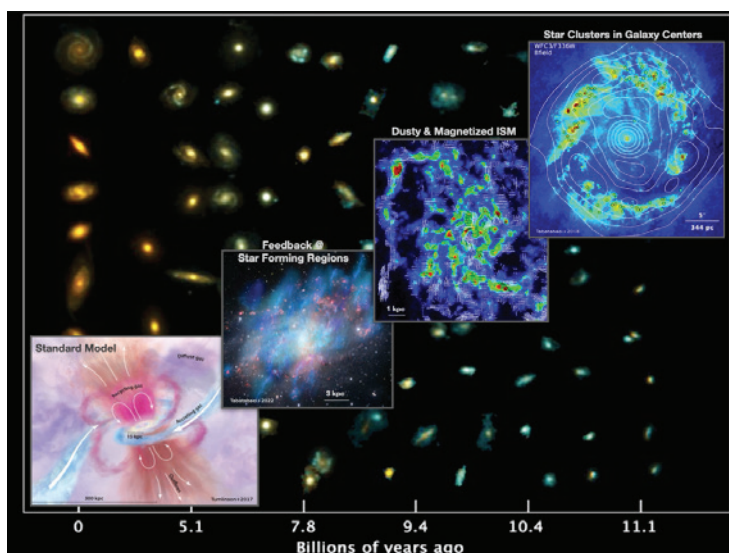


COLLOQUIUM

CRC 1601 HABITATS OF MASSIVE STARS ACROSS COSMIC TIME

June 24, 2025 **NEW DATE: July 15, 2025**

University of Cologne
Physics Institutes
Lecture Hall III, 2:00 pm



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Unveiling role of thermal and nonthermal processes in structure formation and evolution of galaxies

Galaxies evolve as their cool gas reservoirs shrink or become inefficient in forming stars over cosmic time. Although it is still under debate, AGN and supernovae feedback can cause a lack of cool gas which fuels star formation. However, more fundamental studies are vital to address what controls gas clouds and structure (star) formation in galaxies. The radio continuum emission provides an ideal tracer of thermal and nonthermal processes in galaxies. Resolved observations, from radio to optical domains, indicate that the nonthermal pressure inserted by cosmic rays and magnetic fields can play an important role in the energy balance of the interstellar medium which can decelerate the formation of massive stars or trigger winds and outflows. Unresolved multi-wavelength observations in nearby galaxy samples show that the nonthermal pressure increases with star formation activity super-linearly indicating its significance looking back at earlier cosmic times when star formation rate was higher. This is confirmed by our recent radio SED analysis of high- z starburst galaxies in the COSMOS field observed with MeerKAT/VLA/GMRT.

Reviewing these studies, I will present our recent findings and discuss future steps needed to shed light on the topic.