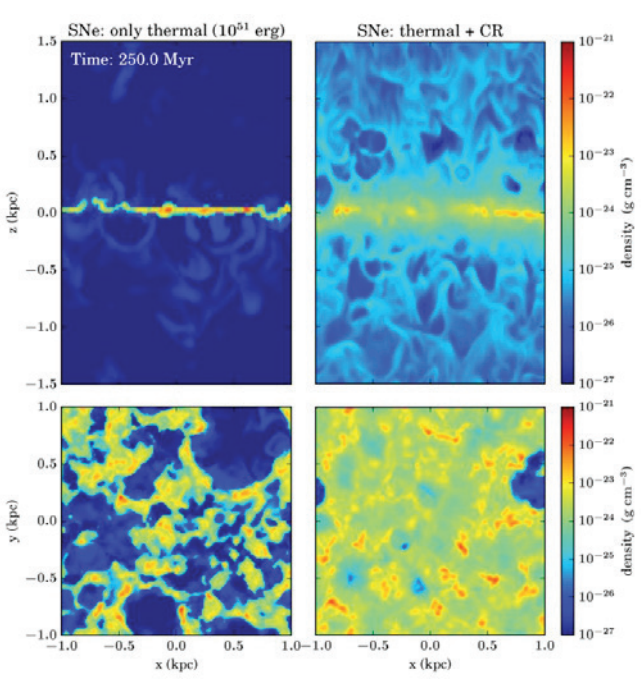
Colloquium

SFB 956

Conditions and Impact of Star Formation

20.06.2016
Monday 3:00 pm

Physikalische Institute Köln
Lecture Hall III
Zülpicher Straße 77 | 50937 Köln



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Dynamical Impact of Galactic Cosmic Rays and the Launching of Outflows

Cosmic rays (CRs) contribute a significant fraction to the overall energy budget in the interstellar medium (ISM). Being high-energy particles, theyhave a small direct collisional interaction with the gas and therefore different cooling and transport properties compared to the thermal gas. We present magnetohydrodynamic simulations of the supernova (SN)-driven, multi-phase ISM in stratified boxes with self-consistent modelling of the cosmic ray transport from the production sites in SN remnants through the magnetised ISM. We find that cosmic rays have a significant impact on the gas distribution in the galactic disc. They increase the scale height of the gaseous component of the disk and are able to launch and sustain outflows with mass loading factors of order unity even for Milky-Way like environments. The interplay between the SN positioning and clustering, the CR injection fractions and diffusion speeds determine the mass loading of galactic outflows, the composition of the outflow and the structure of the gas within the galactic disk as well as in the halo.