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Modeling supernova remnants: effects of diffusive cosmic-ray acceleration on the evolution, application to observations.

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We present numerical models for supernova remnant evolution, using a new version of the hydrodynamical code SUPREMNA. We added cosmic ray diffusion equation to the code scheme, employing two-fluid approximation. We investigate the dynamics of the simulated supernova remnants with different values of cosmic ray acceleration efficiency and diffusion coefficient. We compare the numerical models with observational data of Tycho's and SN1006 supernova remnants. We find models which reproduce the observed locations of the blast wave, contact discontinuity, and reverse shock for the both remnants, thus allowing us to estimate the contribution of cosmic ray particles into total pressure and cosmic-ray energy losses in these supernova remnants. We derive that the energy losses due to cosmic rays escape in Tycho's supernova remnant are 10-20% of the kinetic energy flux and 20-50% in SN1006.

Orateur: Dr KOSENKO, Daria (Astronomical Institut Utrecht)

Classification de Session: Massive stars and cosmic-ray sources