

Understanding the magnetic field evolution in supernova remnants: a crucial role of high-performance computing

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Magnetic fields manifest themselves almost everywhere in the Universe. Their effects are visible through different kinds of electromagnetic radiation and in the spectra of cosmic rays. In our talk, we focus on the magnetic field in supernova remnants. We show how high-performance computing allows us to investigate the evolution of magnetic field in the remnants of different types of supernova and to uncover development of its three-dimensional spatial structures. We demonstrate on example of the remnant of supernova SN1987A that massive three-dimensional MHD simulations coupled with the radio polarization observations result in strong limitations on models of the pre-supernova circumstellar magnetic field in SN1987A and thus of the progenitor star itself.

Primary author: PETRUK, Oleh (Istituto Nazionale di Astrofisica (INAF))

Presenter: PETRUK, Oleh (Istituto Nazionale di Astrofisica (INAF))

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