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PEM033-05

Room: 303

Time: May 27 11:57-12:14

## Response of the solar-terrestrial environment to supernova explosions

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Nearby supernova explosions at 10 pc distance from the Sun put the Earth inside the supernova remnant (SNR), and the severe condition can be a possible origin of Snowball Earth and the birth of complex life. Highly compressed and turbulent heliosphere is predicted from 3D magnetohydrodynamic (MHD) simulation of the nearby SNR collision to the Sun-Earth system. Richtmyer-Meshkov instability at nose may provide a local source of the turbulence associated with the Kelvin-Helmholtz instability in the inner and outer heliosheaths. Asymmetric shape of the heliosphere is expected due to the Parker spiral of interplanetary magnetic field. As a result, it is shown that roughly thousand times larger cosmic ray flux than the present value is predicted to continue for a few thousand years associated with the nearby supernova explosions at 10 pc, while the cosmic ray flux would be limited only a few times larger than the present level for the 100 pc distance cases.