

CRPropa 3.2: An open-source astroparticle propagation framework from TeV to ZeV energies

Experimental observations of Galactic and extragalactic cosmic rays, neutrinos and gamma rays in the last decade challenge the theoretical description of both the sources and the transport of these particles. The latest version of the publicly available simulation framework CRPropa 3.2 is a Monte-Carlo based software package capable of providing consistent solutions of the cosmic-ray origin problem. It is not only able to describe the propagation of Galactic and extragalactic cosmic rays in a ballistic single-particle approach, but can also solve a cosmic-ray transport equation, describe the production and propagation of neutrinos and electromagnetic cascades, and simulate the cosmic-ray acceleration inside their sources. This combined approach will allow for a consistent description of cosmic rays, neutrinos and photons from the highest energies down to the TeV range, including electromagnetic cascades down to the GeV range. I will summarize the latest extensions and improvements of the code and show several examples of studies that have already been done using CRPropa.