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A unified picture for three different cosmic-ray observables

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We present here a unified scenario that connects together three peculiar spectral features recently reported in the spectra of charged cosmic rays (CRs). The hadronic spectral hardening above $\sim 250\,\mathrm{GV}$ is here interpreted as a diffusion imprint, and modeled by means of a transport coefficient that smoothly hardens with rigidity. We implement such a propagation framework to solve the transport equation with the DRAGON2 numerical code in order to determine the large-scale contribution to the CR fluxes. On top of this solution we explore the hypothesis of a nearby, hidden Supernova Remnant (SNR) to be responsible for the high-energy (above $\sim 100\,\mathrm{GeV}$) all-lepton flux, in particular for the spectral break observed around $1\,\mathrm{TeV}$. We compute such contribution analytically adopting the same propagation setup implemented for the large-scale background. Simultaneously, we find the signature of the same source in the peculiar *bump* structure observed by the DAMPE Collaboration in the proton spectrum, consisting of a strong hardening at $\sim 500\,\mathrm{GeV}$ and a softening at $\sim 13\,\mathrm{TeV}$. We validate our hypothesis with the CR dipole-anisotropy (DA) amplitude and phase, and find that the observations below $\sim 10\,\mathrm{TeV}$ can be considered as a signature of the nearby SNR that we invoke. If confirmed, our modelling strongly constrains the propagation parameters of the charged particles in our Galaxy and sets the ground for the understanding of the high-energy γ-ray observations of the forthcoming years.

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