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Cosmic ray propagation in the Galaxy: the role of self-confinement

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Understanding the transport of charged particles in the Galaxy is fundamental to solve the mystery of the origin of Galactic cosmic rays (CR) and to asses their role in several Galactic processes. Recent results from direct experiments, especially AMS-02 and PAMELA, are revealing a fine structure in the CR spectrum which is difficult to explain in the standard picture of Galactic propagation. Some of these features could be understood when the self generated turbulence is taken into account. When CR propagate through a plasma they can trigger the streaming instability which produces resonant Alfvén waves modifying the diffusive properties of the plasma and changing the CR transport itself in a complex non-linear fashion. In this talk I will highlight the role of this self-generated turbulence in several context of the CR journey: during the escape from their sources, close to molecular clouds and during the escape from the Galactic disk.

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