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## Cosmic ray penetration in diffuse clouds

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Cosmic rays (CR) are a fundamental source of ionization for molecular clouds as well as diffuse clouds, influencing their chemical, thermal, and dynamical evolution. The amount of CR inside a cloud also determines the  $\gamma$ -ray flux produced by hadronic collisions between CR and cloud materials. We study the spectrum of CR inside and outside a diffuse cloud for energies  $> \text{MeV}$ . We solve the stationary transport equation for CR in 1-D including diffusion, advection and losses due to ionization of neutral Hydrogen atoms. We found that, for typical number density of diffuse clouds  $\sim 100 \text{ cm}^{-3}$ , and cloud size of  $\sim 10 \text{ pc}$ , the CR spectrum just on the edge of the cloud has a break at energy  $E_{br} \sim 100 \text{ MeV}$ . This breaking energy is due to the fact that particles can cross the cloud many times, hence increasing the energy losses. The presence of the breaks also depends on the CR spectrum far from the cloud.

### Collaboration

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**Author:** Dr MORLINO, Giovanni (Gran Sasso Science Institute)**Co-author:** Dr GABICI, Stefano (CNRS/IN2P3, APC, Université Paris Diderot)**Presenter:** Dr MORLINO, Giovanni (Gran Sasso Science Institute)**Session Classification:** Parallel CR22 TH**Track Classification:** CR-TH