

# Galactic Molecular Clouds As Sources of Secondary Positrons

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Secondary positrons produced inside Galactic Molecular Clouds (GMCs) can contribute significantly to the observed positron spectrum on earth. Multi-wavelength data on GMCs are particularly useful to build this model. Very recent survey implemented the optical/IR dust extinction measurements, to trace 567 GMCs within 4 kpc of Earth, residing in the Galactic plane. We use the updated list of GMCs reported in recent papers, which are distributed in the Galactic plane, to find the secondary positrons produced in them in interactions of cosmic rays with molecular hydrogen. Moreover, by analysing the *Fermi*-LAT data, new GMCs have been discovered near the Galactic plane. We also include some of these GMCs closest to the Earth where cosmic ray interactions are producing secondaries. It has been speculated earlier that cosmic rays may be reaccelerated in some GMCs. We select 7 GMCs out of 567 GMCs recently reported, within 4 kpc of Earth, where reacceleration due to magnetized turbulence is assumed. We include a hardened component of secondary positrons, produced from interaction of reaccelerated CRs in those 7 GMCs. We use publicly available code `DRAGON` for our simulation setup to study CR propagation in the Galaxy and show that the observed positron spectrum can be well explained in the energy range of 1 to 1000 GeV by our self-consistent model.

## Keywords

cosmic rays, gamma rays

## Collaboration

## other Collaboration

## Subcategory

Theoretical Results

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