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Stringent Constraint on Galactic Positron Production JOHN BEACOM, Ohio State University — The intense 0.511 MeV gamma-ray line emission from the Galactic Center observed by INTEGRAL requires a large annihilation rate of nonrelativistic positrons. If these positrons are injected at even mildly relativistic energies, higher-energy gamma rays will also be produced. We calculate the gamma-ray spectrum due to inflight annihilation and compare to the observed diffuse Galactic gamma-ray data. Even in a simplified but conservative treatment, we find that the positron injection energies must be $\lesssim 3$ MeV, which strongly constrains models for Galactic positron production, especially dark matter annihilation.

John Beacom
Ohio State University

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