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Positron Annihilation in the Galaxy: Spatial Distribution and Spectral Characteristics GEORG WEIDENSPOINTNER, JUERGEN KNOEDLSEDER, PIERRE JEAN, GERRY SKINNER, JEAN-PIERRE ROQUES, Centre d'Etude Spatiale des Rayonnements, Toulouse, France, PETER MILNE, Steward Observatory, Tucson, AZ, USA, ROLAND DIEHL, MPE, Garching, Germany — The imaging spectrometer SPI on board ESA's INTEGRAL observatory provides us with an unprecedented view of positrons in our Galaxy.The first all-sky maps in the 511 keV annihilation line and in the positronium continuum showed a puzzling concentration of annihilation radiation in the Galactic bulge. Fine spectroscopy of the bulge emission indicated that the positrons annihilate in the warm interstellar medium. By now, about twice as many INTEGRAL observations are available, allowing us to study the detailed spatial and spectral characteristics of the dominant emission from the Galactic center region and to investigate the faint disk emission. In addition, for the first time we obtain intriguing evidence for extended, low surface brightness emission from regions outside the bulge and the stellar disk. These spatial characteristics are unlike those of any known Galactic population and emphasize the importance of understanding the propagation of positrons when relating the observed sky distribution of 511 keV line emission to the Galactic distribution of potential positron sources.

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