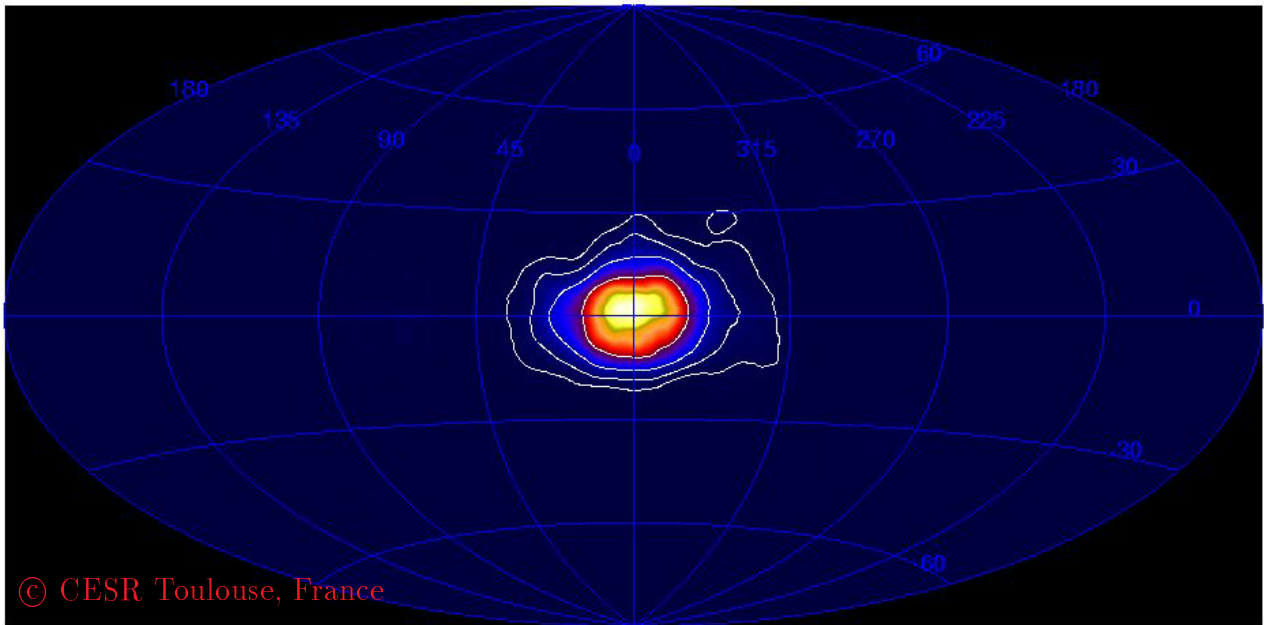


# The First All-Sky Map of Electron-Positron Annihilation



Electrons and their antiparticles, called positrons, cannot coexist. Whenever they meet they mutually annihilate, producing characteristic gamma-radiation. This process has been known for more than 30 years to occur in our Galaxy, yet the origin and the annihilation sites of the galactic positrons remain a longstanding mystery.

Using observations during the first year of the European Space Agency's *INTEGRAL* mission, the imaging spectrometer SPI allowed an international team of scientists to produce the first all-sky map in the 511 keV line characteristic of electron-positron annihilation (Knödlseher et al., *A&A*, in preparation), depicted above. The surprising result is that the annihilation emission is concentrated around the Galactic Center (at the center of the map). Emission outside the Galactic Center, and in particular along the Galactic plane (the equator in the map) is found to be much fainter.

The origin of positrons could be due to the elusive Dark Matter, whose exact nature is still mysterious as it cannot be observed directly, yet is known to be the major constituent of our Galaxy. More conventional explanations for the origin of positrons are objects made up of ordinary matter, specifically members of the old stellar population. Examples for this population are Black Holes and Neutron Stars in binary systems, as well as the debris from stellar explosions (Novae and Supernovae).

More material can be found at <http://heasarc.gsfc.gov/docs/HEAD2004>  
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