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Observation of the ^{26}Al emission distribution throughout the Galaxy with INTEGRAL/SPI

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We present ^{26}Al map distribution throughout the Galaxy measured by the SPI spectrometer aboard the INTEGRAL observatory. This emission at 1.809 MeV is associated with the ^{26}Al decay and to the production of heavy elements in the Galaxy.
The only available ^{26}Al map to date has been released, more than fifteen years ago, thanks to the COMPTEL instrument.
However, at the present time, SPI offers a unique opportunity to enrich this first result. The data accumulated between 2003 and 2013 which amounts to 2×10^{8} s of observing time are used to perform a dedicated analysis, aiming to deeply investigate the spatial morphology of the ^{26}Al emission.
The data are first compared with several sky maps based on observations at various wavelengths to model the ^{26}Al distribution throughout the Galaxy. For most of the distribution models, the inner Galaxy flux is compatible with a value of 3.3×10^{-4} ph. cm^{-2}.s^{-1} while the preferred template maps correspond to young stellar components such as core-collapse supernovae, Wolf-Rayet and massive AGB stars. To get more details about this emission, an image reconstruction is performed using an algorithm based on the maximum-entropy method.
In addition to the inner Galaxy emission, several excesses suggest that some sites of emission are linked to the spiral arms structure.
Lastly, an estimation of the ^{56}Fe line flux, assuming a spatial distribution similar to ^{26}Al line emission, results in a ^{56}Fe to ^{26}Al ratio around 0.14, which agrees with the most recent studies and with the SN explosion model predictions.

Collaboration

– not specified –

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