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Maps in gamma-ray astronomy

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In several branches of astrophysics, high-level data format consists of event lists - containing the reconstructed energy, direction and arrival time (and some other informations, eg: event type) of each event. For analysis and visualisation, maps are made by astronomers with a pixelisation and binning chosen to suit the use case. FITS maps, using either a WCS or a HEALPix format, are commonly used.

An effort has been made over the past few years to define a data model and format for maps in gamma-ray astronomy (GADF; https://gamma-astro-data-formats.readthedocs.io/en/latest/skymaps/) and a prototype implementation in gammapy.maps (https://docs.gammapy.org/0.10/maps) is currently under development. Maps represent pixelized data structures with at least two spatial and an arbitrary number of non-spatial dimensions such as energy, time, event class (or any possible user-defined dimension). This is sufficiently general to act as a container for various objects like sky images and spatially dependent instrument response functions.

In this talk, I will briefly introduce GADF and its implementation within gammapy. The goal is to describe what exists, and to trigger discussion and collaboration both on data format and code aspects to reach a solution that can support many use cases from current and planned telescopes.

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