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Using the virtual observatory to study the gamma-ray sky

Recently, the growth of astrophysical data from science space missions, ground-based telescopes, and theoretical models, which have different services and data stores, has been exorbitant. The latter led to the necessity of unified ways of describing and accessing the data.
The Virtual Observatory (VO) is a framework for astronomical datasets, tools, and services to work seamlessly, connecting the scientific with the data and services providers. To achieve this goal, VO must maintain specific standards adapted to different tools and data types following the FAIR principles (Findable, Accessible, Interoperable, Reusable). The International VO Alliance (IVOA) regulates these standards.
Here we shed light on how VO can facilitate scientific work by providing tools and utilities in the gamma-ray astronomy domain. We show how the interoperable VO tools (like TOPCAT and Aladin) can browse flux maps, search high-energy catalogs, and find available data (from Fermi and HESS) for different gamma-ray emitters together with the manipulation of this data. Furthermore, data can be analyzed with gammapy by connecting it with OPUS (Observatoire de Paris UWS System). Nevertheless, gamma-ray data still needs to adapt to VO standards.
The upcoming Cherenkov Telescope Array is evolving towards the model of a public observatory. The corresponding data will be accessible by the VO as many others, which will ease the scientific work. We conclude that VO is a continuous evolution cycle that changes with the researcher's needs and is essential for improving the scientific community.

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