

# Gamma-ray astronomy: coming of age and revolutions

*Thursday, 28 July 2022 09:45 (45 minutes)*

Gamma-ray astronomy studies the most powerful phenomena in the Universe and tests the limits of our understanding of the laws of physics in extreme conditions. Decades of continuous improvements in experimental techniques for space-borne and ground-based observations have led to an ever-increasing sky and energy coverage. In this presentation I will discuss how the current generation of instruments including Fermi, HAWC, H.E.S.S., MAGIC, and VERITAS has marked the coming of age of gamma-ray astronomy: a growing number of different classes of emitters, more and more often studied from a population point of view, testify how non-thermal particle acceleration and transport proceed in a variety of astrophysical conditions and environments. I will also review the two developments that have revolutionized gamma-ray astronomy in recent years: the advent of multi-messenger observations with gravitational waves and neutrinos, and the opening of the ultra-high energy frontier by LHAASO that made it possible to unveil a surprisingly large number of PeV particle accelerators in the Milky Way. Finally, I will briefly talk about perspectives for unlocking even more science potential with new gamma-ray instruments, including COSI and CTA, scheduled to start operations in the next five years, and other proposed projects.

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**Session Classification:** Invited reviews

**Track Classification:** invited review