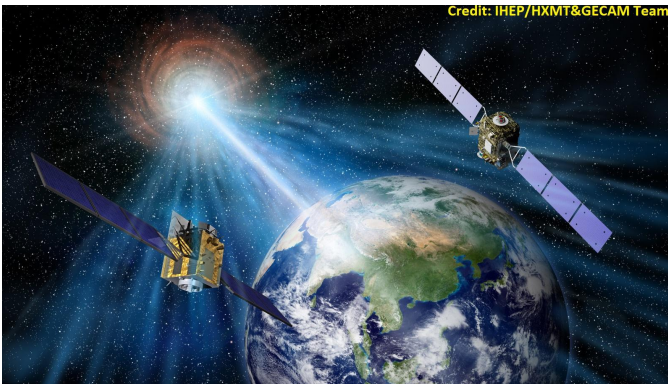


Colloquium

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GRB221009A OR: HOW THE BRIGHTEST GRB EVER CHALLENGES OUR UNDERSTANDING?



Abstract

On October 9, 2022, the Earth was flashed for ten minutes by GRB221009A, the brightest and one of the longest gamma-ray bursts yet observed since the birth of gamma-ray astronomy 50 years ago. The gamma-ray (keV to MeV energy band) flux was so intense that it saturated almost all of the detectors aboard a number of space missions. Remarkably, it

caused a sudden ionospheric disturbance in the lower layers of the Earth's sunlit ionosphere (60-100 km in altitude). The exceptional nature of this event was the result of two rare properties: (i) among the most luminous and energetic ever, and (ii) at redshift $z=0.151$, so relatively close to us (among the 4% nearest ones out of ~ 600 events with measured distance). The unparalleled quality of the data sets collected from numerous space and ground based observatories, encompassing the gamma-ray prompt as well as the afterglow emission (from radio all the way up to the record-breaking value 18 TeV), represents an unprecedented challenge to modelling. As a consequence, no consensus was obtained on some of the key aspects, such as the jet opening angle: was it a truly energetic event with a typical opening angle, or a more ordinary energy release collimated into an exceptionally narrow jet? Can the afterglow theory account for the radio-to-hard energy data set in a self-consistent way? How could a 18-TeV photon escape pair creation along the way due to extra-background light and what are the possible implications? In this talk I will discuss some of the challenges posed by a truly unique event, which will presumably stay in the spotlight for many years to come.

Martedì 9 Maggio 2023 alle ore 15,00
in streaming all'indirizzo <https://meet.google.com/ooi-jrid-jqf>