Contribution ID: **825** Type: **Invited talk in the parallel session**

Theoretical implications on the very high energy emission from GRB 190114C

Monday, 5 July 2021 16:50 (20 minutes)

Since their discovery in the late 1960s Gamma-Ray Burst (GRB) emission has been deeply investigated with the help of the huge amount of data collected covering the entire electromagnetic spectrum. This large and broadband dataset was essential to constitute a general picture describing the GRB physics, revealing the most credible underlying physical processes and environmental conditions ongoing at the GRB site. Huge leaps in the comprehension of the GRB physics have been achieved recently, thanks to the detection of the newly energetic component in the Very High Energy (VHE, E> 100 GeV) domain. The possible presence of a TeV spectral window in GRBs was predicted and theorized for several decades, but the first observational proofs of its existence were reached only in 2019 thanks to the discoveries claimed by the MAGIC and H.E.S.S. telescopes. GRB190114C was successfully detected in the TeV band by the MAGIC telescopes starting from around one minute after its trigger time and lasting for nearly 40 minutes. A successful follow-up campaign was performed and the multi-wavelength afterglow emission of the event was collected from 1 to about 2×10^{17} GHz. Such very broad dataset allows to perform unique studies on the radiation mechanisms and on the physical properties of such event. In this contribution I will describe the main results and the theoretical interpretations that have been derived from the multi-wavelength dataset of GRB190114C. In particular, the description of the TeV component detected by the MAGIC telescopes as produced via the Synchrotron Self-Compton (SSC) mechanism and its connection with the emission at lower energy bands will be presented. Such studies are a fundamental starting point for the interpretation of the current and upcoming events that will be observed in the VHE domain.

Primary authors: MICELI, Davide (University of Udine & INFN Trieste); BERTI, Alessio (Max Planck Institute for Physics); BOSNJAK, Zeljka (Faculty of Electrical Engineering and Computing, University of Zagreb, Zagreb, Croatia); COVINO, Stefano (INAF, Osservatorio Astronomico di Brera, Merate, Italy); FUKAMI, Satoshi (Institute for Cosmic Ray Research, University of Tokyo,Kashiwa, Japan); INOUE, Susumu (RIKEN, Wako, Saitama, Japan); LONGO, Francesco (University of Trieste and INFN, Trieste); MORETTI, Elena (IFAE-BIST, Bellaterra (Barcelona), Spain); NAVA, Lara (INAF, Osservatorio Astronomico di Brera, Merate, Italy); NODA, Koji (Institute for Cosmic Ray Research, University of Tokyo,Kashiwa, Japan); SUDA, Yusuke (Hiroshima University, Hiroshima, Japan); VOVK, Ievgen (Institute for Cosmic Ray Research, University of Tokyo,Kashiwa, Japan)

Presenter: MICELI, Davide (University of Udine & INFN Trieste)

Session Classification: High and Very High Energy Emission from Gamma-Ray Bursts

Track Classification: Fast Transients: High and Very High Energy emission from Gamma Ray Bursts