



Contribution ID: 512

Type: **Talk in a parallel session**

Evidence of mini-jet emission in a large emission zone from a magnetically-dominated gamma-ray burst jet

Monday, 8 July 2024 18:15 (15 minutes)

The second brightest GRB in history, GRB230307A provides an ideal laboratory to study the details of GRB prompt emission thanks to its extraordinarily high photon statistics and its single broad pulse overall shape characterized by an energy-dependent fast-rise-exponential-decay (FRED) profile. Here we demonstrate that its broad pulse is composed of many rapidly variable short pulses, rather than being the superposition of many short pulses on top of a slow component. Such a feature is consistent with the picture of many mini-jets due to local magnetic reconnection events in a large emission zone far from the GRB central engine, as envisaged in the internal-collision-induced magnetic reconnection and turbulence (ICMART) model, but raises a great challenge to the internal shock models that attribute all variability components to collisions among different shells. Since relativistic mini-jets demand strong magnetization in the outflow, this work provides strong evidence for a Poynting-flux-dominated jet composition of this bright GRB.

Primary author: YI, Shu-Xu (Institute of High Energy Physics, Chinese Academy of Sciences)

Presenter: YI, Shu-Xu (Institute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: Gamma-ray bursts and AGNs with machine learning

Track Classification: Gamma-Ray Bursts (GB): Gamma ray bursts relationships in multi-wavelengths as cosmological tools