Contribution ID: **43** Type: **Oral contribution**

# Constraining blazar emission models with the study of waiting time between gamma-ray flares of FSRQs

*Wednesday, 7 September 2022 12:10 (20 minutes)*

I report here the results of a study of waiting times between Gamma-ray flares of FSRQ, defined as the time intervals between consecutive activity peaks.
I will show that this study constrains the physical mechanism responsible for gamma-ray emission.
We obtained that waiting times between flares can be described with a Poissonian process, consisting of a set of overlapping bursts of flares, with an average burst duration of ~0.6 year and average rate of ~1.3 y−1. For short waiting times (below 1 d host-frame) we found a statistically relevant second population, the fast component, consisting of a few tens of cases, most of them revealed for CTA 102. Interestingly, the period of conspicuous detection of the fast component of waiting times for CTA 102 coincides with the reported crossing time of the superluminal K1 feature with the C1 stationary feature in radio.
To reconcile the recollimation shock scenario with the bursting activity, we have to assume that plasma should have a typical length of ~2 pc (in the stream reference frame) when it reaches the recollimation shock. Otherwise, the distribution of waiting times can be interpreted as originating from relativistic plasma moving along the jet for a deprojected length of ~30−50 pc (assuming a bulk Lorentz factor = 10) that sporadically causes gamma-ray flares, hopefully triggered by magnetic field structures along its path.
In the magnetic reconnection scenario, reconnection events or plasma injection to the reconnection sites should be intermittent. Individual plasmoids can be resolved in a few favourable cases only, and could be responsible for the fast component.

## Collaboration

**Primary author:** Dr PACCIANI, Luigi (IAPS-INAF)

**Presenter:** Dr PACCIANI, Luigi (IAPS-INAF)

**Session Classification:** Extragalactic Astrophysical accelerators