

An orphan flare from a plasma blob crossing the broad-line region ?

Monday 2 September 2024 09:44 (1 minute)

The flat-spectrum radio quasar 3C 279 is well known for its prolific emission of rapid flares. One particular event occurred on December 20th, 2013, exhibiting a large flux increase with a doubling time scale of a few hours, a very hard γ -ray spectrum, and a time asymmetry with a slow decay, while no significant variations in the optical range were detected.

We propose a novel scenario to interpret this “orphan flare”, based on two emission zones corresponding to a stationary and a fast moving plasma blob. While the stationary blob is located within the broad-line region (BLR) and accounts for the low-state emission, the moving blob decouples from the stationary zone, accelerates and crosses the BLR. The high-energy flare can be attributed to the variable external Compton emission as the blob moves through the BLR, while the variations in the synchrotron emission remain negligible.

Our description differs from previous interpretations of this flare by not relying on any acceleration mechanisms of the electrons in the plasma blob. Instead, the flare emerges as a consequence of the bulk motion of the blob and the geometry of the external photon fields.

Primary author: Mr LE BIHAN, Sébastien (LUTH, Observatoire de Paris - PSL)

Co-authors: Dr DMYTRIIEV, Anton (North-West University); ZECH, Andreas (LUTH, Observatoire de Paris - PSL, CNRS, 5 pl. Jules Janssen, 92195 Meudon)

Presenter: ZECH, Andreas (LUTH, Observatoire de Paris - PSL, CNRS, 5 pl. Jules Janssen, 92195 Meudon)

Session Classification: Poster hang