



# X-RAY ASTRONOMY 2019

*Current Challenges and New Frontiers in the Next Decade*

8-13 September 2019  
CNR/INAF Research Area, Bologna, Italy

Contribution ID: 61

Type: **Poster**

## Searching for X-ray emission from an electron/positron pair halo with current generation and next generation X-ray telescopes

*Friday, 13 September 2019 15:16 (1 minute)*

An electron/positron pair halo is the electromagnetic cascade generated under extragalactic magnetic field when very high energy  $\gamma$ -rays, particularly from blazar, interact with the extragalactic background light and/or the cosmic microwave background forming the pairs of electron/positron and further lower energy  $\gamma$ -rays. These result in an extended emission of the  $\gamma$ -rays enclosing the host blazar, i.e. halo. The search for the halo emission has been attempted primarily in the  $\gamma$ -rays regime and no detection has been claimed to date. Indeed, if such an halo presents in a sufficiently strong magnetic field, the X-ray light could be also generated via synchrotron emission process, providing another opportunity for searching the halo. In this work, we aim to test whether the X-ray emission from the halo would be detected by the current generation and next generation X-ray telescopes: i.e. *XMM-Newton* and *Athena*, respectively. The Monte Carlo technique is used to simulate the X-ray emissions of the halo at different initial conditions such as different energy distributions of the seed  $\gamma$ -rays photons and different levels of magnetic field. The possibility of detecting the halo emission by the X-ray telescopes is then determined using the response matrix and ancillary response files provided on the telescope webpages. In this presentation, we will show whether the halo emission would be detected by the X-ray telescopes? We will also discuss the range of physical parameters of the halo which make the halo emission statistically detectable.

### Topic

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**Session Classification:** POSTER SESSION