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# Classification and Reconstruction of single and multiple ELVES in AUGER

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ELVES are regularly being studied since 2013 with the twenty-four FD Telescopes of the Pierre Auger Observatory, exploiting a dedicated trigger and extended readout.

A large fraction of the observed events shows double ELVES within the time window, and, in some cases, even more complex structures are observed. We classify double ELVES using radial variation of the time gap and the photon flux ratio between flashes.

Such parameters may be related to the different types of lightning in which they are originated. We will review the cross correlations of the ELVES light emissions with the radio waves detected by the antennas of the ENTLN network, active in Argentina since late 2018. Further improvements of our detection and classification algorithms were achieved by detecting ELVES from closer lightning: since December 2020, the ELVES trigger was extended to the three High Elevation Auger Telescopes (HEAT), which observe the night sky at elevation angles between 30 and 60 degrees, with an enhanced time resolution (50 ns time binning). Both single and double ELVES are recorded with unprecedented time and space resolution. Events from the first year of data taking will be shown.

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