



A non-intrusive method to determine atmospheric electric fields under thunderstorm conditions.

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During thunderstorm conditions radio emission from extensive air showers are influenced by atmospheric electric fields. These effects are observed at LOw Frequency ARray (LOFAR) radio telescope. We have developed a non-intrusive method to determine the atmospheric electric fields by using the intensity data of the radio signals [?].

We show that the events under thunderstorm conditions have larger circular polarization component near the core of the shower than the events under fair weather conditions. We demonstrate quantitatively that this is related to the change in direction of the transverse current which is caused by the variation of the atmospheric electric fields. Therefore, the use of the circular polarization data puts strong additional constrains on the structure of the atmospheric electric fields than what could be achieved by using only the radio intensity.

References

[1] P. Schellart et al., arXiv:1406.1355 [astro-ph.HE].