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# Testing a two component approach to describe radio emission from air showers

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The radiation emitted by atmospheric showers is currently interpreted in terms of the deviation of the charged particles in the magnetic field of the Earth and the emission due to the charge excess (Askary'an effect). Each of these mechanisms has a distinctive polarization. The complex signal patterns obtained both in dedicated experiments measuring average behaviors and in simulations, can be qualitatively explained as the interference (superposition) of the fields induced by each mechanism.

This work is an attempt to explicitly and quantitatively test a simple phenomenological model based on this idea (two dominant emission mechanisms). The model is constructed by isolating each of the two components at the simulation level and by making use of
approximate symmetries for each of the contributions separately. The results of the model are then checked against full ZHAireS simulations of the electric field calculated from first principles. With these simulations, that are now known to reproduce experimental data, we show that the simple model describes radio emission at a few percent level in a wide range of shower-observer geometries and on a shower-by-shower basis. This conclusion converts this approach in a simple method to reduce the computing time needed to accurately predict the electric field of radio pulses emitted from air showers, with many practical applications
in experimental situations of interest.

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