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Simulating radio signals from cosmic-ray induced air showers reflecting from a surface

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The recent detection of radio pulses with the ANITA experiment has revealed characteristic signatures of geomagnetic emission and has been attributed to coherent radio flashes from air showers that get reflected on the ice cap. In spite of recent progress in simulating and understanding radio pulses from air showers, no detailed studies are available to date to address the impact of the reflection process on the characteristics of the signal and the extent to which coherence is affected. In this contribution we present a modified version of the ZHAireS code explicitly tailored to calculate radio emission reflected from a surface. We obtain predictions for the characteristics of the electric field for different shower orientations. The results of our simulations are understood and validated with a raytracing algorithm and a simple model.

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