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First results from EVA simulations; Cherenkov effects and the chemical composition of the initial cosmic ray.

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We discuss the first results of macroscopic calculations based on full Monte-Carlo simulations including a realistic index of refraction using the EVA-code. Due to the finite refractivity Cherenkov effects play an important role in radio emission from air showers. We show that the observed frequency spectrum depends strongly on the distance from the shower core. At the Cherenkov angle the high frequency components have the largest power. It follows that the Lateral Distribution Function of the radio emission can be used as an excellent probe to determine the shower maximum and thus give a handle on the chemical composition of the initial cosmic ray. Furthermore, we show how Cherenkov effects affect the two main emission mechanisms, the geomagnetic emission and the charge-excess emission.

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