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Electron and ion kinetics in electrostatic tripolar regions

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We present a kinetic interpretation of electrostatic tripolar regions observed in space plasmas. We show that a sufficient smoothness of the potential's waveform, the non-negativity and a sufficient roughness of the electron and ion distribution functions are able to explain the main morphological features of the region's electrostatic potential such as the sign and estimate of its skewness and the ratio of the potential jumps within the region. We also present an illustrative model based on non Maxwellian distribution functions which reproduces one specific potential waveform observed by WIND's Time Domain Sampler.