Kinetic model for the evaluation of spatial charge effects in retarding field analysers applied to vacuum arc devices
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We develop a kinetic formalism to determine the charge spatial distribution and the self-consistent electrostatic potential in the grid-collector region of a retarding field analyser system applied to vacuum arc devices. This work is the natural extension of a previous work where a uniform spatial distribution of charge was assumed to explain certain anomalies arising in measurements of vacuum arc ion energy distributions, if charge effects were not included. We compare different approaches (no charge effects, spatially uniform charge density and kinetic treatment) which can be used to find the ion energy distribution in vacuum arcs. We show that under conditions usually met in these devices it is necessary to use the kinetic approach for the correct interpretation of measurements employing retarding field analysers.