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Pattern formation in liquids under unipolar space charge injection¹ FRANCISCO VEGA REYES, Departamento de Fisica, Universidad de Extremadura, E-06071 Badajoz, Spain, FRANCISCO J. GARCIA, Departamento de Fisica Aplicada I, EUITA, Universidad de Sevilla, Spain — We study experimentally the hydrodynamic stability of thin liquid layers subjected to corona discharge in the air. We obtain clear direct images and movies of the observed hydrodynamic instabilities and patterns. After this we apply an image processing method that allows us to quantify the liquid interface deformation. We use a variety of liquids whose properties may differ in orders of magnitude. Particularly, we use series of liquids with different electric conductivity or viscosity while keeping constant the rest of the properties. In this way, we can track quantitatively the instabilities as a function of only one of these properties. This, together with our image processing method, allows us to study and classify the different instabilities. The peculiar properties of the electric field in the liquid interface when there is a space charge injection have not been studied until very recently. Results show clearly the influence (and relevancy) that the properties of this electric field have in the formation (or not) of the different patterns observed when the liquid properties are varied.

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