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Breakup length of harmonically stimulated capillary jets – theory and experiments[1] FRANCISCO JAVIER GARCIA GARCIA, HELIODORO GONZALEZ GARCIA, University of Seville, JOSE RAFAEL CASTREJON-PITA, University of Cambridge, ALFONSO ARTURO CASTREJON-PITA, University of Oxford — A stream of liquid breaks up into several drops by the action of surface tension. Capillary breakup forms the basis of some modern digital technologies, especially inkjet printing (including 3D manufacturing). Therefore, the control and prediction of the breakup length of harmonically modulated capillary jets is of great importance, in particular in Continuous InkJet systems (CIJ). However, a theoretical model that rigorously takes into account the physical characteristics of the system, and that properly describes this phenomenon did not exist until now. In this work we present a simple transfer function, derived from first principles, that accurately predicts the experimentally obtained breakup lengths of pressure-modulated capillary jets. No fitting parameters are necessary. A detailed description of the theoretical model and experimental setup will be presented.

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