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Drop ejection conditions from breaking capillary waves. BABURAJ PUTHANVEETTIL, Indian Institute of Technology, Madras, India., EMIL J. HOPFINGER, LEGI/ UJF, Grenoble, LEGI COLLABORATION, IIT MADRAS COLLABORATION — An experimental study of parametrically excited non-linear surface waves is presented. Forcing frequencies are in the range 25 to 100 Hz, resulting in gravity/capillary waves for the liquids investigated. For a given frequency, the wave pattern evolution with forcing amplitude has been determined up to droplet ejection. The wave motion becomes rapidly chaotic with the wave lengths being approximated by a Gaussian distribution. Wave breaking with droplet ejection is closely approximated by the threshold acceleration proposed by Goodridge et al [1] for the capillary wave limit. A gravity/capillary scaling is here introduced from which the crossover from gravity to capillary dominated breaking conditions is deduced. The mean wave acceleration at breaking is an order of magnitude larger than the container acceleration and this remains valid for synchronous waves (horizontal forcing). The droplet ejection rate is shown to depend, in additions to the wave frequency, on the wavelength, hence the liquid properties. Drop sizes are shown to scale with the wave length. [1] Goodridge et al. Phys. Rev. E, Vol. 56, No. 1,1997, pp. 472.

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