

Abstract Submitted  
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**Doubly-excited pulse-waves on flowing liquid films: experiments and numerical simulations**<sup>1</sup> IDRIS ADEBAYO, ZHIHUA XIE, Imperial College London, ZHIZHAO CHE, Tianjin University, China, ALEX WRAY, OMAR MATAR, Imperial College London — The interaction patterns between doubly-excited pulse waves on a flowing liquid film are studied both experimentally and numerically. The flowing film is constituted on an inclined glass substrate while pulse-waves are excited on the film surface by means of a solenoid valve connected to a relay which receives signals from customised Matlab routines. The effect of varying the system parameters i.e. film flow rate, inter-pulse interval and substrate inclination angle on the pulse interaction patterns are then studied. Results show that different interaction patterns exist for these binary pulses; which include a singular behaviour, complete merger, partial merger and total non-coalescence. A regime map of these patterns is then plotted for each inclination angles examined, based on the film  $Re$  and the inter-pulse interval. Finally, the individual effect of the system parameters on the merging distance of these binary pulses in the merger mode is then studied and the results validated using both numerical simulations and mathematical modelling.

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Omar Matar  
Imperial College London

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