

Abstract Submitted
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Numerical investigation of drop impact on controlled films using a massively parallelised DNS code: Blue¹ DAMIR JURIC, LIMSI, CNRS, IDRIS ADEBAYO, LYES KAHOUADJI, Imperial College London, JALEL CHERGUI, LIMSI, CNRS, SEUNGWON SHIN, Hongik University, OMAR K. MATAR, Imperial College London — We study the outcome of droplet impact on controlled flowing liquid films using a massively-parallelised three-dimensional simulation code *Blue*. The code utilises a domain-decomposition strategy for parallelization with MPI, while the fluid interface solver is based on a parallel implementation of a hybrid front-tracking/level set method. We control the film surface dynamics by an application of periodic inlet-forcing of the film flowrate, which ensures that droplet impact occurs on different, targeted regions of spatio-temporal regularly forming solitary waves, namely flat film, wave humps and capillary waves preceding a large-amplitude wave. The uniqueness and differences between outcomes obtained on these individual regions are then compared qualitatively and quantitatively. Finally, the individual contributions of the film flow rate, droplet speed, and droplet size on the droplet impact outcomes are also studied, and the results validated against previous experimental studies.

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