Abstract Submitted
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**A control volume study of the pressure tensor across a liquid-vapour interface**[1] CARLOS BRAGA, PETR YATSYSHIN, EDWARD SMITH, ANDREAS NOLD, Imperial College London, BENJAMIN GODDARD, The University of Edinburgh, NIKOS SAVVA, Cardiff University, MARKUS SCHMUCK, Heriot-Watt University, ANDREW DUNCAN, Imperial College London, DAVID SIBLEY, Loughborough University, SERAFIM KALLIADASIS, Imperial College London — The presence of an interface renders the properties of the system position dependent. The pressure tensor will no longer be uniform nor isotropic giving rise to the surface tension. The theory of Kirkwood-Buff gives a formal description of the surface tension based on the analysis of the local pressure tensor while capillary wave theory assumes the existence of an instantaneous intrinsic surface separating the liquid and vapour. Analysis of its Fourier components gives both structural and dynamical routes to compute the surface based on hydrodynamic theory. The defining equation of a capillary surface is given by the stress balance between the pressure tensors and the surface tension. Here, we employ the instantaneous interface as a representative surface across which we compute the local pressures following the seminal work of Irving and Kirkwood. The control volume approach to the Irving-Kirkwood expressions provides an exact balance between the stress and momentum transfer across the surface element allowing the study of the surface tension from a mechanical standpoint.

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