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**Numerical computation of charge transport in flows of dielectric liquids**[1] MATHIEU CALERO, HOLGER GROSSHANS, MILTIADIS PAPALEXANDRIS, None — Flow electrification during transport of dielectric liquids constitutes a major safety hazard. More specifically, at sufficiently high Reynolds numbers and for low-conductivity fluids such as liquid hydrocarbons, the thickness of the hydrodynamic boundary layer can become comparable to that of the electrical double layer. In turn, this leads to increased transport of electric charges away from the wall region and towards the bulk of the flow. Moreover, the transport of charges is further enhanced due to turbulent mixing. However, quantitative information on the underpinning mechanisms of this phenomenon is still lacking. In the first part of this presentation we outline a computational framework that we recently developed for the simulation of wall-bounded flows of dielectric liquids and, in particular, for the numerical study of flow electrification. In the second part, we present results from two cases of laminar flow electrification that we studied numerically in order to assess the efficiency of the proposed numerical procedures. Finally, preliminary results of turbulent flow electrification at weak turbulent intensities are also presented herein.

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