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**Dynamics of a moving liquid sheet in the presence of acoustics**[1]
MAHESH TIRUMKUDULU, MANJULA PARAMATI, Department of Chemical Engineering, Indian Institute of Technology Bombay, Mumbai, India, PETER SCHMID, Laboratorie d'Hydrodynamique, Ecole Polytechnique, Paris, France — A moving liquid sheet produced by impinging two collinear jets of water was recently shown to be unstable to a select set of acoustic frequencies (Mulmule et al, Vol 22, 022101, Phys. Fluids, (2010)). In order to better understand the phenomenon, we have developed a non-contact technique based on laser induced fluorescence to measure both the displacement and the thickness variation of the liquid sheet. As expected, the liquid sheet thickness varies inversely with radial distance from the point of impingement in the absence of acoustics. In the presence of acoustic forcing (50-150 Hz), experiments reveal that while the sinuous deformation mode is present at all frequencies, the sheet break at the select set of frequencies occurs due to significantly high growth rates of the varicose mode. We present the variation of the measured wave speeds and growth rates as a function of the forcing frequency. These results agree qualitatively with the predictions of the aforementioned study which shows that the varicose and sinuous modes are coupled at the lowest order when the sheet is subjected to acoustics.

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