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Measurement of the growth rate of the breakup instability of a propane nanobridge using molecular dynamics simulations WEI KANG, UZI LANDMAN, School of Physics, Georgia Institute of Technology — Understanding the instability of a nanojet or a nanobridge is of importance for the design of nanoscale fluid devices. Examination and determination of the whole growth rate curve of the instability in these nanostructures is a theoretical challenge. Using large scale molecular dynamics (MD) simulations at 185K we determined the growth rate curve of a nanoscale liquid propane nanobridge of a 0.3 micron length and a 6-8 nm diamater; the system consistes of 340,000 particles. We analyzed, using a discrete spatial Fourier transform, the time evolution of small sinusoidal perturbations of various wavelengths applied to the fluid nanobridge. The large length-to-diameter ratio of our systems allows us to achieve suffcient wavelength resolution. The results of 100 independent simulations were averaged to reduce fluctuation noise. The results were compared with both Rayleigh's and Chandrasekhar's theories and we conclude that the latter is a better fit to our data.

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