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Using instability of nanometric liquid Cu films on SiO2 substrates to determine the underlying van der Waals potential[1] ALEJANDRO G. GONZÁLEZ, JAVIER A. DIEZ, Instituto de Física Arroyo Seco (CIFICEN-CONICET), Universidad Nacional del Centro de la Provincia de Buenos Aires, YUEYING WU, Department of Materials Sciences and Engineering, University of Tennessee, Knoxville, JASON D. FOWLKES, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, PHILIP D. RACK, Department of Materials Sciences and Engineering, University of Tennessee, Knoxville, LOU KONDIC, Department of Mathematical Sciences, New Jersey Institute of Technology — We study the instability of nanometric Cu thin films on a SiO2 substrate. The metal is melted by means of laser pulses for some tens of nanoseconds. The free surface destabilizes during the liquid lifetime, leading to the formation of holes at first and to metal drops on the substrate in later stages. By analyzing the Fourier transforms of the SEM images obtained during the metal film evolution, we determine the emerging length scales for both early and late stages of the instability development. The results are analyzed within the framework of a long-wave hydrodynamic model, which introduces van der Waals forces by means of disjoining and conjoining pressures. These forces are characterized by a pair of exponents for the ratio $h/h*$, where h is the liquid thickness and h_* is a residual one. We find that the pair $(3, 2)$ provides a good agreement for the relationship of the wavelength with maximum growth rate, λ_m, while other typical pairs, such as $(4, 3)$ and $(9, 3)$ do not provide accurate description of the experimental data (Langmuir **29**, 9378 (2013)).

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