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Liquid drop spreading on surfaces: Initial regimes revisited SURJYASISH MITRA, SUSHANTA MITRA, York University — Liquid drop spreading on a given surface is fundamental towards technological processes like coating and paints, inkjet printing, surface characterization, etc. Though, the underlying dynamics is well understood, we have revisited this problem through experiments conducted on surfaces kept in air as well as immersed in water. It was found that the two key parameters that dictated the spreading process were drop-surrounding medium viscosity ratio and the characteristic viscous length scale. It was observed that irrespective of the drop liquid and surrounding liquid medium (air and water in this case), spreading always began in a regime dominated by drop viscosity, where the spreading radius scales as r$\sim$t . However, the prefactor of the scaling observed was different for air (of the order of unity) and under-water (much less than unity). Following this initial regime, a second intermediate regime dominated by drop inertia (typically found for water drops spreading in air) was observed only when the characteristic viscous length scale favored such a transition. In this regime as well, a non-universal prefactor was noted for the scaling law, i.e., r$\sim$t$^{1/2}$. In all cases considered, the spreading process terminated in the Tanner's regime where the spreading radius scaled as r$\sim$t$^{1/10}$.

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