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Supporting Material: Curvature dynamics and long-range effects on fluid-fluid interfaces with colloids

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Average fluid domain size

In this section we plot the average fluid domains size $L(t)$ for different values of particle volume fraction V_f and aspect ratio A (Fig.1).

By following a standard approach[1], $L(t)$ can be estimated by calculating the inverse of the first moment of the spherically averaged structure factor $S(k,t) = \langle \phi(\mathbf{k},t)\phi(-\mathbf{k},t)\rangle_k$,

$$L(t) = 2\pi \frac{\int S(k,t)dk}{\int kS(k,t)dk}, \quad (1)$$

where $\phi(\mathbf{k},t)$ is the spatial Fourier transform of $\phi(\mathbf{r},t)$, k is the modulus wave vector of $\mathbf{k}$ and $\langle\rangle_k$ is an average over a shell in $\mathbf{k}$ space at fixed k.

In all cases domains grow by following a time power law t^{Υ} within a range going from $t \simeq 10^3\Delta t$ to $t \simeq 4\times 10^3\Delta t$. The exponent Υ is found approximately equal to 0.6, although a slight dynamic speed-up is observed for increasing values of A and V_f. We consider the values of $L(t)$ acceptable up to $t \simeq 5.5\times 10^3\Delta t$, after which finite size effects become dominant. Although at $t > 3\times 10^3\Delta t$ $L(t)$ is larger than $L/4$, our choice of investigating the physics above such values (but below $t \simeq 5.5\times 10^3\Delta t$) ensures that the interface curvature is reasonably at steady state (see Fig.6-7 of the main text) and finite size effects are acceptably mild.

Notes and references

1 V. M. Kendon, M. E. Cates, I. Pagonabarraga, J. C. Desplat, and P. Bladon, J. Fluid Mech. **440**, 147 (2001).

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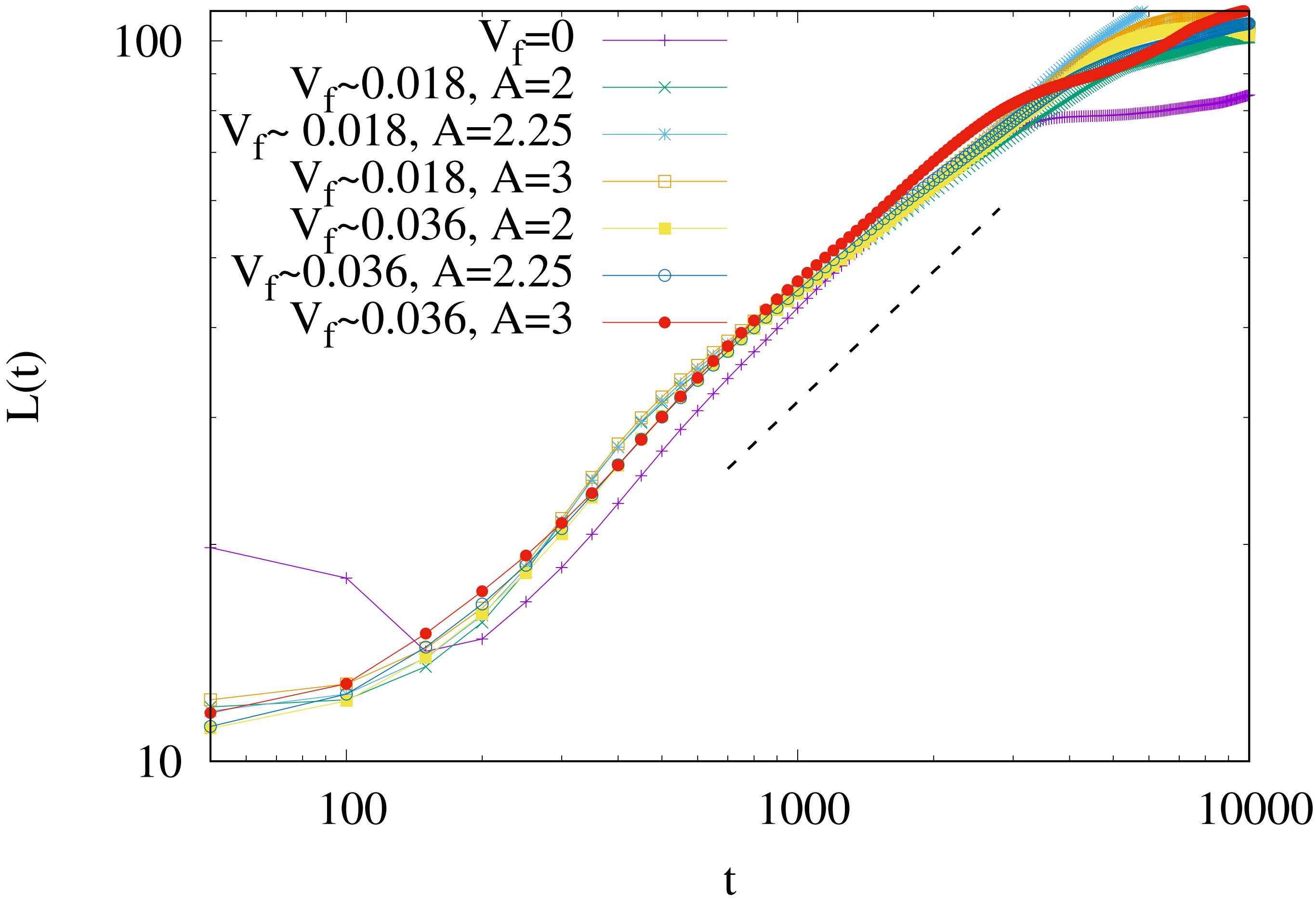

Fig. 1 Average fluid domain size $L(t)$ for different values of particle volume fraction V_f and aspect ratio A. A slight speed-up of the phase separation dynamics is observed for increasing values of V_f and A, with negligible effects on the slope of the curves. Domains grow following a time power law t^{Υ}, where $\Upsilon \simeq 0.6$, within the region from $t \simeq 10^3 \Delta t$ to $t \simeq 3 \times 10^3 \Delta t$. The dashed line, with a slope 0.6, is a guide to the eye. Log-log scale is set on both axis.