# Dynamics of a colloid-stabilized cream

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Several studies of soft-glassy materials using photon correlation spectroscopy have shown curious dynamics: a linear relationship between the probed length scale and the relaxation time in combination with a faster than exponential relaxation. Furthermore, the dynamics are often characterized by intermittent events and show a delicate dependency on sample age. We have explored related behaviour in the context of a colloid-stabilized emulsion as it becomes a compact cream layer using x-ray photon correlation spectroscopy.

Our samples, dodecane-in-water emulsions, have interfaces stabilized solely by colloidal particles (silica). They were observed soon after mixing: as the emulsion becomes compact we discern two regimes of ageing with a cross-over between them. The young emulsion has faster dynamics associated with creaming in a crowded environment accompanied by local rearrangements. The dynamics slow down for the older emulsion although our studies show that motion is associated with large intermittent events. The relaxation rate, as seen from the intensity autocorrelation function, depends linearly on the wave vector at all times; however, the exponent associated with the line shape changes from 1.5 for young samples to less than 1 as the emulsion ages. The combination of ballisticlike dynamics, an exponent that drops below 1 and large intermittent fluctuations has not been reported before. We will finish by outlining subsequent studies of the dynamics of nanoparticle gels in a liquid crystalline solvent.