

# Memories in Suspensions

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The mechanical properties of soft materials can often depend on preparation. Here we explore suspensions in which preparation programs a specific memory that can be recalled: the system “learns” the strain amplitude of oscillatory shear, which tunes the future mechanical response at that specific strain. This can be understood as the evolution of this out-of-equilibrium system to a steady state that is reversible under further driving. Our experiments involve shearing non-Brownian, neutrally buoyant suspensions in a rheometer. We demonstrate memories of single strains, and continue to multiple memories, their properties and behaviors, and the limits on memories’ coexistence.