

## **Aging of soft colloidal suspensions studied by macro- and micro-rheology**

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Soft colloidal suspensions at high concentrations, form glasses, which show aging behavior. The mechanical relaxation processes in these materials slow down with their age and equilibrium is never reached. This has not only consequences for practical materials like cosmetic creams and pastes but, from a fundamental point of view, it has also influence on the dynamical behavior of these materials, which is not well understood. We studied both the macro- and micro- rheology of soft thermosensitive microgel particle suspensions that can be tuned continuously and reversibly between the glassy state at low and the liquid state at high temperature. In the glassy state, the rheological properties ( $G'$ ,  $G''$ , and  $J$ ) of the suspensions depend strongly on their age [1]. They can be described quantitatively by the soft glassy rheology (SGR) model. The underlying mechanism for the aging is the increase of the structural relaxation time  $t_s$  as the system ages. To test for micro-rheological properties we determined the mean square displacement (MSD) of probe particles, embedded in the system. The MSD values were obtained from particle tracking using a Confocal Scanning Laser Microscope. This technique provides not only the MSD values but also the displacement distributions and the time evolution of single particle displacements, which are indicative for heterogeneity of the suspension.

[1] Eko H. Purnomo, Dirk van den Ende, Siva Vanapalli and Frieder Mugele; Phys. Rev. Lett. 101 (2008) 238301: 1-4; Dirk van den Ende, Eko Purnomo, Michel Duits, Walter Richtering and Frieder Mugele; Phys. Rev. E 81 (2010) 011404: 1-9