

## Patterns formed by magnetic particles in a fluctuating magnetic field

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It is very important to understand the formation process of complex nano/micro structures in colloidal systems from both scientific and technological points of view [1,2]. In this study, we investigate the growth process of clusters formed by paramagnetic microparticles in a combined fluctuating magnetic field composed of dc and ac fields, which are generated, respectively, in vertical and horizontal directions (see Figure 1). The motion of the clusters was monitored with a microscope and recorded on the hard disc of the computer.

We find that walls are formed in the dc/ac combined magnetic fields. The thickness of the walls is the same as the diameter of a particle. We also find that clusters grow via tip-to-tip coagulation. The dynamics and structures of the clusters formed by the particles; i.e., the time variation of the growth of clusters, the total number of clusters and the dynamic scaling function are analysed [3], which will be shown at the poster session.

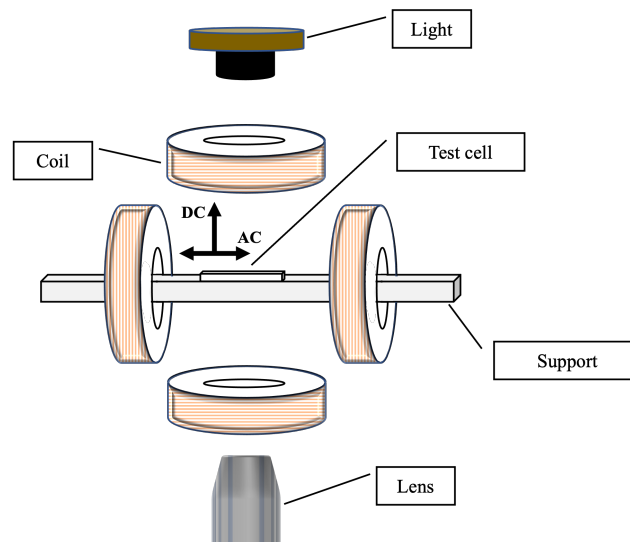


Figure 1. Outline of the experimental setup. The test cell, which confines paramagnetic particles dispersed in distilled water, is placed at the centre of the coils. Dc and ac combined magnetic fields are applied to the colloidal system.

### Reference:

- [1] Nagaoka Y., Morimoto H. and Maekawa T., *Langmuir* 2011, 27, 9160–9164.
- [2] Aldo Spatafora-Salazar et al., *Soft Matter*, 2021, 17, 1120-1155
- [3] F. Martínez-Pedrero., *Advances in Colloid and Interface Science* 284 (2020) 102233