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**Phase separation in two-dimensional colloidal suspension using rotating magnetic fields** AN PHAM, YUAN ZHUANG, PAIGE DETWILER, ASHUTOSH CHILKOTI, JOSHUA E. S. SOCOLAR, PATRICK CHARBONNEAU, BENJAMIN B. YELLEN, Duke Univ — We study phase separation in a quasi two-dimensional system of magnetically susceptible colloids in a high-frequency rotating magnetic field. By tuning the interparticle interactions and particle area fractions in-situ, we construct an experimental phase diagram that matches with simulatios. Our theoretical model is based on the pairwise interaction energy between magnetic point dipoles, which are simulated with advanced Monte Carlo simulation methods. The best fit between experiments and simulations allows us to calibrate the magnetic susceptibility of the beads. We also show that the simulations match the experimental dynamics of the domain coarsening process. Based on the calibrated experimental apparatus, we change the cone angle of the rotating field and study the change in the kinetic pathways of phase separation. For low tilt angles (in plane fields), the system separates into a bicontinuous morphology, whereas at tilt angles near the magic angle, the system aggregate by Ostwald ripening.

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