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Biomedical Applications of Nanoparticles ASHLEY RICE, ANA OPRISAN, SORINEL OPRISAN, College of Charleston, CDRIC GIRAUDET, Friedrich-Alexander University of Erlangen-Nrnberg, FABRIZIO CROCCOLO, University of Milano — Nanoparticles of iron oxide have a high surface area and can be controlled by an external magnetic field. Since they have a fast response to the applied magnetic field, these systems have been used for numerous in vivo applications, such as MRI contrast enhancement, hyperthermia, drug delivery, and cell separation. We performed a total of six imaging experiments using direct imaging and shadowgraphy methods in order to investigate the concentration-driven fluctuations using magnetic nanoparticles in the absence and in the presence of a magnetic field. The direct imaging and shadowgraphy experimental setups both involved a glass cell filled with magnetic nanocolloidal suspension and water with the concentration gradient oriented against the gravitational field and a superluminescent diode (SLD) as the light source.We recorded the diffusion with a CCD camera and used a dynamic structure factor algorithm for image processing in order to extract the thermophysical properties such as the structure factor and the correlation time. The difference between the direct imaging method and the shadowgraphy method is the presence of an object on the CCD camera during direct imaging. Using the correlation time, we were able to determine the diffusion coefficient.

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