MSc Seminar, Bendeguz Sulyok

Names of students *

Budai Ákos, Földvári Dominic

Summarize the talk in 5-10 numbered sentences. Some guidance: What is the physical setup presented? What are the control parameters? What are the quantities measured/calculated? Which methods were used? Is this subject particularly interesting or relevant? Why? Do you have any questions? Any comments, suggestions regarding the presentation? *

1. The talk was about Reconfigurable ferromagnetic droplets. We have ferrofluids, which are paramegnetic at room temperature by default, but we want it to carry ferromagnetic properties.
2. These properties are utilizied in sealing equipments.
3. Ferrofluid contains magnetic nanoparticles, a surfactant and a carrier fluid.
4. The droplet is reshaped by a capillary technique (sonication) to reach neccesarry properties. Then magnetic nano particles (MNP) are jammed on the surface.
5. Unjamming the system can be done by manipulating the binding energy of MNP-surfactant interaction.
6. Upon external magnet ferromagnetic liquid dorplets are the fastest to move towards it. They are much more responsive.
7. Eventually a material was created with both properties of a solid magnet and a liquid.

Good talk!

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Borsi Márton, Tamás Gábor

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1. The topic of the talk was related to ferrofluids.
2. A ferrofluid is paramagnetic at room temperature while ferromagnets are typically rigid.
3. The surfacial MNPs can no longer freely rotate.
4. Lowering the binding energy of MNP-surfactant unjams the system.
5. Ferrofluids consist of magnetic nanoparticles, sufactants and carrier fluid.
6. Jamming makes the drops unable to reshape themselves to optimal form.
7. There is a reversible phase transition between the ferrofluid and ferromagnetic liquid droplets.
8. Supressing the Brownian motion is necessary to observe the ferromagnetic effects.

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Andras Palyi

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1. Ferrofluids were introduced (magnetic nanoparticle (MNP), surfactant, carrier liquid).
2. An interesting effect: take a spherical droplet, add surfactant to the water surrounding the droplet; this attracts the MNP to the droplet surface. Reshaping the droplet will be "plastic" and not "elastic", as the surfactant in the water pull more MNPs to the droplet surface. Jamming of the MNPs prevent the elastic behavior.
3. Unjamming can be initiated by increasing the PH of the water around the droplet. Why does the PH of water influence the jamming behavior?
4. It was claimed that increasing the viscosity of the ferrofluid makes the material more ferromagnetic. What's the mechanism causing this?
5. I couldn't get what was happening in the experiments where the motion of droplets was controlled by external magnet? E.g., why were different types of droplets mixed in the liquid?
6. The magnetization behavior of the droplet, the sonicated droplet, and the bulk material is essentially the same. This sounds rather boring.

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László Gyulai, Zsolt Györgypál

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1. Unfortunately we sent the summary to Gabor's form... Sorry for the inconvenience :(

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Zsolt Szabó, Réka Szilvasi

Summarize the talk in 5-10 numbered sentences. Some guidance: What is the physical setup presented? What are the control parameters? What are the quantities measured/calculated? Which methods were used? Is this subject particularly interesting or relevant? Why? Do you have any questions? Any comments, suggestions regarding the presentation? *

The presentation was about ferroliquids. These are materials with characteristics of liquids and magnetic properties. Ferroliquids consits of magnetic nanoparticles, the so called surfactant which prevent sticking of MNPs, and a carrier fluid. These materials are paramagnetic at room temperature and ferromagnetic behaviour can be observed when the Brownian motion of the MNPs is surpressed (high viscosity, low temperature). We can observe the ferromagnetic phase by the jamming of surfacial MNPs: reshaping increasis the surface while the volume is unchanged. The relevant properties are as follows: surfacial MNPs can no longer freely rotate in the jammed state and the ratio of the saturation magnetisation and remanant magnetisation is uniform.

Zsolt's note: the speaker appearingly talked about an article he didn't contribute to. He frequently used the phrase "we did this, we did that..." Question: who is that "we"?
;-)

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Vízkeleti Áron, Szász-Schagrin Dávid

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1. The goal of the research showed was to give fluid ferro magnets some of the advantages of solid ferro magnets, by keeping the fluid reconfigurable.
2. Ferromagnetic particles (Magnetic Nano Particles) are put in oil, and with the use of surfactants little droplets are created, later reshaped into the form of “rods”.
3. Thanks to these droplets, hysteresis can be created (the rods cannot rotate freely)
4. Sonication increases surface vs volume ratio (magnetic properties are independent of this). Decrease (or increase) of pH changes bounding energy of the surfactant.
5.Thus, a phase change occurs, the “rods” become “unjammed” and the droplets can be re-formed.
6. Experiments prove the ferromagnetic behavior of the fluid.

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Sári Péter, Balázs Péter, Irene Mastrodicasa

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1. Convolutional neural networks are types of deep neural networks.
2. Instead of using fully connected layers, we use convolutional layers as well, which are sensitive to spatial information.
3. This is an ideal method for image recognition.
4. These networks can behave unpredictably sometimes, such in the case of distinguishing wolves and huskies.
5. It is an useful tool when observing gravitational lensing.

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Szombathy Dominik, Kovács Panna

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1. Bendeguz's talk was about reconfigurable ferromagnetic droplets, the presentation begun with a real-life application of liquid ferromagnets.
2. These ferromagnetic droplets consists of magentic nanoparticles (MNPs), surfactants and carrier fluids.
3. The main idea was jamming the surficial MNPs, reshaping of the droplet preserved its volume, but the surface increased, more surfactants and MNPs assembled at it.
4. The experimental hysteresis loops showed that the magnetic properties are independent of S/V.
5. Bendeguz also presented that this phase transition is reverseble, for example external electric field or increasing pH can lead to it.

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