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日本機械学会北海道支部 バイオメカニクス懇話会  
第51回講演会

(共催：日本機械学会北海道支部)

主査 大橋 俊朗

下記の要領にて、第51回講演会を日本機械学会北海道支部特別講演会との共催として開催いたします。皆様のご参加をお待ちしております。

記

日時：2025年3月4日(火)、14:00～15:00  
場所：北海道大学工学部 A1-17

講演：

「From individual constituents to overall behavior in systems of soft and active matter. Part II」  
Prof. Dr. Andreas Menzel  
Institute of Physics (Institut für Physik)  
Faculty of Natural Sciences (Fakultät für Naturwissenschaften)  
Otto von Guericke University Magdeburg, Germany (Otto-von-Guericke-Universität Magdeburg, Deutschland)

Soft matter has many faces. Yet, one common characteristic is that it responds relatively strongly to relatively weak stimuli. We address two such cases that link input of stimuli on the microscale to overall response and appearance of the materials on collective and macroscopic scales.

First, magnetic gels and elastomers consist of magnetizable micrometer-sized particles embedded in a soft surrounding polymeric carrier medium. Upon magnetization, particles in an appropriate relative position will attract each other. This attraction may overcome the elastic barrier, so that they abruptly approach. Indeed, we have observed and described a corresponding effect. The microscopic restructuring is associated with significant stiffening on the macroscopic level.

Second, active suspensions contain self-propelling microscopic objects in a viscous liquid serving as a carrier medium. Depending on the level of activity and the associated energy input of the discrete microscopic entities, different types of collective dynamics of the whole suspension are observed. At elevated levels of activity, dynamic states of so-called mesoscale turbulence emerge. We address such states for a shear-thinning carrier fluid. It turns out that the transition to mesoscale turbulence becomes hysteretic in this case, associated with spatial heterogenization.

Future couplings between these properties of activated and active as well as elastic and viscous systems, establishing associated relations, are well conceivable and pursued.

世話人・問い合わせ先：

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