

## 日大理工・船橋・一般物理の談話会の案内

講演題目 : Structure formation in magnetic particle systems

講演者 : Prof. Ferenc Kun (Department of Theoretical Physics,  
University of Debrecen, Hungary)

日時 : 2015 年 5 月 25 日 (月) 16 : 40 ~ 18 : 10

場所 : 日本大学理工学部船橋校舎 14 号館 5 階 1454 教室

(東西線直通・東葉高速鉄道・船橋日大前駅下車正面)

要旨 :

In colloids particles with permanent magnetic dipole moment undergo aggregation processes and form various types of structures. We present an experimental and theoretical study of this structure formation both in the presence and absence of an external magnetic field. As a simple experimental realization of the system we consider particles floating on the surface of a liquid with dipole moments oriented along the plane of motion. A three-dimensional discrete element model is developed which captures the main ingredients of the underlying dynamics. We show that in the absence of an external magnetic field the particles self-assemble into chains and rings which in turn merge and build up a net-like structure. We analyze both the temporal evolution and the geometry of the resulting particle network. In the presence of an external field the dipole chains tend to align with the field which is then followed by the aggregation of chains into columns along the perpendicular direction. We characterize the mechanical stability and breakup of chains and rings with respect to a gradually increasing field and determine the critical field of rupture. Computer simulations are carried out to understand how the presence of non-magnetic particles affects the aggregation process and the resulting structures.

問い合わせ先 : 中原明生 [nakahara@phys.ge.cst.nihon-u.ac.jp](mailto:nakahara@phys.ge.cst.nihon-u.ac.jp)