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Magnetostructures — •Wafflard Adrien, Vandewalle Nicolas, and Opsomer Eric — GRASP, Institut de Physique B5a, Université de Liège, Liège, BE

Playing with spherical neodymium magnets that you find in your favorite toy market is really addicting. By assuming they are uniformly magnetized, magnetic beads behave as point-like dipoles. For scientists, those inexpensive objects demonstrate how dipolar particles self-assemble into various structures ranging from 1D chains to 3D crystals. We show that magnetotubes and magnetocrystals can self-buckle, i.e. change their geometry, above a critical aspect ratio. The underlying dipolar ordering is found to exhibit a collective reorganization, altering the mechanical stability of the entire system. We identify the conditions in which these phenomena occur and conjecture that *in chains, square or cubic magnetostructures, neighboring dipoles reorientate in order to form the longest possible chains.* This suggests that a wide variety of magnetostructures, including well known stable structures, may collapse due to reorientation of dipoles.

Part:	**DY**
Type:	**Vortrag;Talk**
Topic:	**Granular Matter / Contact Dynamics**
Email:	**adrien.wafflard@uliege.be**