

第29回 非線形科学セミナー

日時：平成23年9月29日（木）16時30分～

場所：未定（決定次第お知らせします。）

講演者：Helmut Brand 教授

Theoretical Physics III, University Bayreuth

題目：MACROSCOPIC BEHAVIOR OF ACTIVE SYSTEMS
WITH A DYNAMIC PREFERRED DIRECTION

We present the derivation of macroscopic equations for active systems with a dynamic preferred direction, which can be either axial or polar. Such an approach is expected to be applicable and important for biological systems, which have preferred directions only dynamically, but not permanently or in a static configuration. For an axial preferred direction we introduce the time derivative of the local preferred direction as a new variable and discuss its macroscopic consequences including new cross-coupling terms. We investigate the coupling to a gel for which one has the strain tensor and relative rotations between the new variable and the network as additional macroscopic variables. For the case of a dynamic polar preferred direction the additional macroscopic variables transforms like a velocity under parity and time reversal. This approach is expected to be useful for a number of biological systems including, for example, the formation of dynamic macroscopic patterns shown by certain bacteria such as *Proteus mirabilis*.