

日本物理学会北海道支部講演会  
トポロジー理工学教育研究センター

# 第 154 回エンレイソウの会

場 所 : 北海道大学理学部2号館2階 2-211

日 時 : 平成 23 年 9 月 16 日 (金曜日) 13:00-14:00

講演者 : Prof. Dr. Helmut R. Brand  
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題 目 : 『MACROSCOPIC BEHAVIOR OF ACTIVE SYSTEMS  
WITH A DYNAMIC PREFERRED DIRECTION』

要 旨 : 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*.

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