

# Eugene Wigner Colloquium

*joint event of GRK 1558 and SFB 910*



## Prof. Peter Lenz

Philipps-Universität Marburg

### “Self-organized biological patterns in systems with density-suppressed motility”

Periodic stripe patterns are ubiquitous in living organisms. In many cases, however, the underlying developmental processes are complex and difficult to disentangle. In a novel synthetic biology approach we have implemented a genetic circuit that couples cell density and motility into the bacterium *E. coli*. This system enabled the programmed cells to form periodic stripes of high — and low — cell densities sequentially and autonomously. To study theoretically the origin and mechanism of this process we have developed a kinetic model that includes growth and density-suppressed motility of the cells. In this model we analyze the onset of pattern formation by calculating the front profile of a region of immotile cells that spreads into an initially cell-free region. From the calculated front profile we provide an analytic ansatz to determine the phase boundary between the stripe and the no-stripe phases. The influence of various parameters on the phase boundary is discussed.

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**Thursday, 06.02.14 · 16:15h · EW 202**

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