

# Stuttering of Min oscillations is induced by stochastic effects

Lukas Wettmann<sup>1</sup> and Karsten Kruse<sup>1</sup>

*Theoretical Physics, Saarland University, Saarbrücken, Germany*

The site of cell division in wild type *E. coli* bacteria is determined through pole-to-pole oscillations of the Min proteins. Although the oscillations are fairly stable across a wide variety of cell shapes and protein concentrations the emerging patterns are subject to molecular noise, due to the small copy number of proteins in a single cell. This causes the oscillations to sometimes "stutter" and remain in the same polar configuration. We use a simple, generic model of protein interactions which shows similar behaviour as the Min-system and analyze the stochastic dynamics in the limit of weak noise to understand the underlying effects.