



# Sommerfeld Theory Colloquium

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Self-Organization Strategies:  
Lessons from the Biology of Homology Recognition

Homologous recombination (HR) plays an important role in meiosis and DNA damage repair . It is known that during HR an incoming single-stranded DNA molecule (ssDNA) bound to RecA searches for a sequence matched double-stranded DNA molecule (dsDNA) and then self-assembles into a new stable structure which incorporates the homologous dsDNA; however, the exact mechanisms that allow this search and self-assembly to be both rapid and accurate have been unknown. We propose homology recognition involves a collective interaction between the DNA basepairs that extends well beyond nearest neighbors because the basepairs are all mechanically coupled to each other. As a result, homology recognition proceeds through a series of fully reversible checkpoints that determine whether to bind an additional dsDNA base pair triplet to the ssDNA/RecA filament or unbind a previously bound triplet, where changes in mechanical stress on the dsDNA make binding additional triplets highly favorable for homologs and highly unfavorable for mismatched sequences.

Wednesday, 27 June 2012, 16:15h, Room A348/349, Theresienstr. 37/III

Prof. I. Sachs