Evolution of scroll rings in confined geometry under variation of the excitation threshold

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Spatio-temporal dynamics of freely travelling scroll waves have been observed and investigated in a variety of dissipative non-equilibrium systems. The focus of this presentation will be a systematic numerical analysis of scroll ring evolution under continuous variation of the excitation threshold. Simulations were performed in the framework of the modified complete Oregonator model [1] which describes the PBZR at best qualitatively. Variation of the local excitation threshold is achieved by changing the intensity of applied illumination. While for small intensity values the filament tension is positive for sufficiently large intensity values a transition to negative line tension occurs. In the latter case we observe in the confined system formation of stable autonomous pacemakers and suppression of Winfree turbulence while scroll rings with positive line tension experience considerable lifetime enhancement due to no-flux boundary interaction.

1. H. J. Krug, L. Pohlmann, and L. Kuhnert, J. Phys. Chem. **94**, 4862-4866 (1990).