Karlsruhe Institute of Technology

Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 25/26

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**Seminar room: SR 3.069**

# Bright and Dark Pulses in the Lugiato-Lefever Equation with Periodic Forcing

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**Abstract**

We consider a damped and periodically driven nonlinear Schrödinger (NLS) equation,

$$iu_t = -du_{xx} + icu_x + (\zeta - i)u - |u|^2 u + if(x)$$

which is a variant of the Lugiato-Lefever equation. This model arises in the description of microcombs in nonlinear optics. In the focusing case $d > 0$, we show that periodic forcing leads to stable, localized multi-pulse solutions with oscillatory tails that bifurcate from the bright NLS soliton. For the defocusing case $d < 0$, we prove existence results of dark pulse solutions, which we obtain by pasting together a front and a back solution. Numerical simulations with pde2path corroborate our analytical findings. This is based on a joint project with Björn de Rijk.