

Seminar of the Work Group  
Nonlinear Partial Differential Equations  
WS 23/24

**November 21st, 2023, 11:30 - 12:00**  
**Seminar room: SR 3.061**

## Going Around in Circles: Developing a Functional Analytic Framework for Radial Solutions to PDEs

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### Abstract

Understanding spatial localisation in higher dimensions remains an open problem in many contexts. There has been recent progress in studying localised axisymmetric and dihedral patterns by expressing the problem in polar coordinates and utilising theory from radial spatial dynamics. However, such techniques are often insufficient for obtaining rigorous existence results.

In order to further develop analytic tools—such as centre-manifold reductions—for radial PDE systems, we first need to establish the basic theory of radial function spaces. In contrast to general nonautonomous PDEs, radial PDEs possess highly structured nonautonomous terms and explicit smoothness conditions at the origin.

In this talk I will introduce a new framework for radial function spaces, by considering the natural nonautonomous radial differential operators associated with radial PDEs. Following this, I will conclude by briefly discussing future applications of this analytic framework.

This work is in collaboration with Mark Groves (Saarland).