

SPEAKER: Lutz Weis, KIT-Universitt Karlsruhe

TITLE: Spectral multiplier theorems for sectorial operators on Banach spaces

ABSTRACT: Spectral multiplier theorems extend the classical Fourier multiplier theorems of Mihlin and Hörmander to other Laplace type operators such as Laplace Beltrami operators on manifolds, graph Laplacians and Schrödinger operators. Their proofs usually depend on kernel estimates for the heat semigroup, e.g. Gaussian estimates, and harmonic analysis. We show in the talk that such spectral multiplier results can also be obtained via the holomorphic functional calculus and norm estimates on the associated semigroup or resolvent. This allows us to consider a large class of sectorial operators on Banachspaces, among them non selfadjoint operators and operators not defined on the whole L_p scale. It is shown how the optimal smoothness of the Hörmander class depends on the geometric properties of the Banach space such as type and cotype. Finally we point out that these spectral multiplier theorems allow to define Littlewood-Paley decompositions which are of interest in applications to evolution equations.