PARTIAL GROUP ACTIONS AND BOUNDARY VALUE PROBLEMS

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Let Γ be a discrete group which acts on a manifold W. Suppose $M\subseteq W$ is a compact submanifold with boundary which is not Γ-invariant. Then the interior of M carries a partial Γ-action and one can study the partial shifts U_g for $g\in\Gamma$ on $L^2(M)$ given by
\begin{equation*}
    U_g\varphi(x)=\begin{cases}
        \varphi(g^{-1}\cdot x) &\text{if }g^{-1}\cdot x\in M,\\
        0 &\text{else.}
                \end{cases}
\end{equation*}
In this talk, I will describe an algebra of operators $A\subseteq\mathbb B(L^2M\oplus L^2\partial M)$ generated by boundary value problems on M and the partial shifts U_g for $g\in\Gamma$ (under suitable assumptions on the action). As in the classical Boutet de Monvel calculus, there are two principal symbol maps defined on A: one associated with the interior and one with the boundary. Here, they take values in crossed product algebras of corresponding partial actions. Then an operator in A is Fredholm if and only these principal symbols are invertible. I will discuss how one can classify the stable homotopy classe of elliptic operators over A in terms of K-theory.

This talk is based on joint work with Anton Savin and Elmar Schrohe.