SEVERINO TOSCANO DO REGO MELO, Universidade de São Paulo
K-theory of pseudodifferential operators with semiperiodic symbols on a cylinder.

Let B be a compact Riemannian manifold, let Ω denote the cylinder $\mathbb{R} \times B$, Δ_Ω its Laplace operator and $\Lambda = (1 - \Delta_\Omega)^{-1/2}$. Let $\mathfrak{A}$ denote the C*-algebra of bounded operators on $L^2(\mathbb{R} \times B)$ generated by all the classical pseudodifferential operators on $\mathbb{R} \times B$ of the form $L\Lambda^N$, N a nonnegative integer and L an N-th order differential operator whose (local) coefficients approach 2π-periodic functions at $+\infty$ and $-\infty$. Let $\mathfrak{E}$ denote the kernel of the continuous extension of the principal symbol to $\mathfrak{A}$. The problem of computing the K-theory index map $\delta_1(K_1(\mathfrak{A}/\mathfrak{E})) \to K_0(\mathfrak{E}) \simeq \mathbb{Z}^2$ on an element of $K_1(\mathfrak{A}/\mathfrak{E})$ is reduced to the problem of computing the Fredholm indices of two elliptic operators on the compact manifold $S^1 \times B$. In the case $B = S^1$, it follows from considerations about various exact sequences of C*-subalgebras of $\mathfrak{A}$ that δ_1 is onto and that $K_0(\mathfrak{A}) \simeq \mathbb{Z}^5$ and $K_1(\mathfrak{A}) \simeq \mathbb{Z}^4$. This talk is based on joint work with Patricia Hess.