Euclidean Invariant Subspace Lattices

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The lattice of all projections in $L^2(\mathbb{R})$ which are invariant under the semigroup $\{M_\lambda : \lambda \geq 0\}$ of multiplications by the functions $e^{i\lambda x}$ and also under the translation semigroup $\{D_\mu : \mu \geq 0\}$ is homeomorphic to the closed unit disc (under the topology of pointwise convergence). When the translation semigroup is replaced by the semigroup of dilation operators $f(x) \to f(sx)$, $0 < s < \infty$, the new lattice is again a compact connected locally Euclidean space. In both cases, the corresponding operator algebras contain no nonzero selfadjoint or finite rank operators; however they have a contractive approximate identity consisting of integral operators. The isometric automorphism groups of the algebras are explicitly identified as Lie groups.

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