Spectrum of pseudo-Riemannian locally symmetric spaces

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Let L and H be two connected non compact reductive closed subgroups of a connected non compact real semisimple Lie group G with finite center and without compact factors. Suppose that G/H is an irreducible symmetric space on which L acts transitively. In the case when $L \cap H$ is compact in G, we compute the image of the Casimir operator through the natural embedding of $D(G/H)$ into $D(L/L \cap H)$, where $D(G/H)$ (resp. $D(L/L \cap H)$) denotes the algebra of left-invariant differential operators on G/H (resp. $L/L \cap H$). We deduce, in terms of the unitary dual of the group $L = U(1, n)$, an explicit description of the spectrum of the Laplacian on the Lorentzian locally symmetric spaces $\Gamma \backslash SO_e(2, 2n)/SO_e(1, 2n)$, for positive integers n, where Γ is a discrete cocompact subgroup without non-trivial elements conjugate to $L \cap H$. In particular, we will see that some representations of $U(1, n)$ occur with (in)finite multiplicities, and that the spectrum is not (completely) discrete. This is joint work with Martin Olbrich (Univ. Luxembourg).