ABSTRACT

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<u>A Paley-Wiener Theorem for All Two and Three-Step Nilpotent Lie Groups</u> Dissertation directed by Professor Leonard Richardson

A Paley-Wiener Theorem for all connected, simply-connected two and threestep nilpotent Lie groups is proved. If $\varphi \in L_c^{\infty}(G)$, where G is a connected, simplyconnected two or three-step nilpotent Lie group such that the operator-valued Fourier transform $\widehat{\varphi}(\pi) = 0$ for all π in E, a subset of \widehat{G} of positive Plancherel measure, then it is shown that $\varphi = 0$ a. e. on G. The proof uses representationtheoretic methods from Kirillov theory for nilpotent Lie groups, and uses an integral formula for the operator-valued Fourier transform $\widehat{\varphi}(\pi)$. It is also shown by example that the condition that G be simply-connected is necessary.