A Paley–Wiener–Schwartz Theorem for valuations on convex functions

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Much of the immense progress in Geometric Valuation Theory over the last 30 years is based on Alesker's solution to McMullen's Conjecture, which characterizes continuous translation invariant valuations on convex bodies as uniform limits of linear combinations of mixed volumes. In fact, Alesker established a much stronger result, called the Irreducibility Theorem, which provides a representation theoretic description of the space of these valuations. One of key consequences of this description was the introduction of the notion of *smooth valuations*, which enjoy very strong regularity properties and admit a variety of integral and differential geometric descriptions.

In this talk I will present a different approach to regularity results of this kind for dually epi-translation invariant valuations on convex functions. In particular, we will discuss how one can directly obtain suitable integral representations of these functionals from a Paley–Wiener–Schwartz-type regularity characterization of certain distributions associated to these valuations in terms of the decaying properties of their Fourier-Laplace transform.