



## Mathematisches Kolloquium

# The role of Banach Gelfand Triples for Conceptual Harmonic Analysis

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Classical Harmonic Analysis is focussing very much on the Lebesgue spaces  $L^1$ ;  $L^2$ ;  $L^\infty$ , because they appear at first sight as natural domains for convolution or the Fourier transform. As it has turned out a variant of distribution theory, arising from problems in time-frequency analysis, gives rise to a description of the Fourier transform as an automorphism of the *Banach Gelfand Triple* (or rigged Hilbert space)  $(S_0; L^2; S'_0)(\mathbb{R}^d)$ , i.e. the Plancherel theorem restricts well to the space of test functions  $S_0(\mathbb{R}^d)$  but also extends well to the distributions in  $S'_0(\mathbb{R}^d)$ , including Dirac measures, Dirac combs, or pure frequencies. As time permits we will also talk about *Fourier Standard Spaces*, a family of Banach spaces between  $S_0(\mathbb{R}^d)$  and  $S'_0(\mathbb{R}^d)$ , with some extra properties, essentially allowing smoothing (by convolution) and localization (by pointwise multiplication), indicating the richness of this family of Fourier standard spaces, among them *Wiener amalgam spaces* or *modulation spaces*, and to present a few general claims which can be made for the Banach spaces in this family. Of course, the classical  $L^p$ -spaces belong to this family, however without playing a significant role there.

**Mittwoch, 17. Mai 2017, KGI/Bau A 103, 17.00 Uhr s.t.**  
Um 16.30 Uhr wird im gleichen Raum Kaffee und Tee serviert