Abstract:
The Connection Between the Kadison-Singer Problem and Frame Theory

Nicolas Nagel

In the last couple of years frame theory became an important tool to study problems in approximation theory. The most important event in this regard was the solution to the long standing Kadison-Singer problem by Marcus, Spielman, Srivastava (2013/15) and the subsequent work of Nitzan, Olevskii, Ulanovskii (2014) who applied it to construct frames of Fourier functions over sets of finite measure in $\mathbb{R}$.

In its original inception, the Kadison-Singer problem is about abstract operator theory and applications to quantum mechanics. Over the years a multitude of equivalent statements in an equally diverse range of fields were found, including (among others) Anderson's paving conjecture, the Feichtinger conjecture and, most importantly for us, Weaver's KS_2-conjecture. This last approach is where frame theory comes into play and which gives us many new tools for approximation theoretic problems.

The talk gives an overview on the Kadison-Singer problem, its application to frame theory and recent results that build on it.