Existence of the integrated density of states for Hamiltonians on Cayley graphs

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In this talk we study the existence of the integrated density of states (IDS) for operators defined on Cayley graphs. The IDS of a selfadjoint operator encodes the distribution of its spectrum on the real axis. There are two generic ways to define the IDS. The first one is to state it as a so-called Pastur-Shubin trace formula as a rather abstract object. In the second way one considers finite dimensional approximants and states the IDS as limit of distribution functions. In this talk we focus on the latter way. The operators in question are Hamiltonians defined on geometric structures given via finitely generated groups. These geometries include $\mathbb{Z}^d$ and k-valent trees but do go far beyond. Depending on the specific properties of the groups, we can show weak convergence as well as uniform convergence. Beside this we are able to treat random models given via a percolation process. Involved methods are ergodic theory, large deviation theory and the investigation of tiling properties of groups.

The talk is based on joint works with S. Ayadi, D. Lenz, F. Pogorzelski, S. Schumacher and I. Veselić.