Title: Almost exponential decay of quantum resonance states and Paley-Wiener type estimates in Gevrey spaces

Abstract: Let H_0 be a self-adjoint operator in some Hilbert space, and let λ_0 be a (possibly degenerate) eigenvalue of H_0 embedded in its essential spectrum $\sigma_{\text{ess}}(H_0)$ with corresponding eigenprojection Π_0. For small $|\kappa|$, let $H(\kappa)$ be a family of perturbed Hamiltonians, which is analytic in a generalized Balslev-Combes sense. The corrections to exponential decay in

$$\Pi_0 e^{-itH(\kappa)} g(H(\kappa))\Pi_0 = D(\kappa)e^{-ith(\kappa)}D(\kappa) + \mathcal{R}(\kappa, t)$$

will be discussed, where $D(\kappa) = \Pi_0 + O(\kappa^2)$ $(\kappa \to 0)$ and $h(\kappa)$ is some family of in general non self-adjoint bounded operators with $\text{Ran}h(\kappa) = \text{Ran}\Pi_0$, leaving $\text{Ran}\Pi_0$ invariant, and $0 \leq g \leq 1$ is a cut-off function with $g(\lambda_0) = 1$ and sufficiently small support. The main result is a sharp estimate of the remainder $\mathcal{R}(\kappa, t)$ in terms of the Gevrey index $a > 1$, $b > 0$ of $g \in \Gamma^{a,b}(\mathbb{R})$: $\|\mathcal{R}(\kappa, t)\| \leq O(\kappa^2)\, e^{-Ct^{\frac{1}{a}}}$ $\quad (t \geq 0,\ C < ab^{-\frac{1}{a}},\ \kappa \to 0)$.
This is joint work with M. Klein.