

# Large time behaviour of heat kernels and admissible potentials

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Let  $T$  be a positivity improving selfadjoint  $C_0$ -semigroup on  $L_2(\Omega, \mu)$  with generator  $-H$ . The following two questions are going to be addressed in the talk:

- Assuming the semigroup operators  $T(t)$  have integral kernels  $p_t$ , what is the long time behaviour of  $p_t(x, y)$ , given  $x, y \in \Omega$ ?
- For a measurable potential  $V: \Omega \rightarrow [0, \infty)$ , when does the initial value problem

$$u'(t) + Hu(t) = Vu(t) \quad (t > 0), \quad u(0) = u_0$$

have a positive *exponentially bounded* solution, given a positive initial value  $u_0 > 0$ ?

The talk is based on joint work with M. Keller, D. Lenz and R. Wojciechowski.