DISPERSIVE ESTIMATE FOR 1D SCHRÖDINGER EQUATIONS WITH STEP-LIKE POTENTIALS

We prove a sharp decay estimate $|u| \lesssim |t|^{-1/2}$ for a 1D Schrödinger equation

$$iu_t - u_{xx} + V(x)u + H(x)u = 0$$

where $H(x)$ is the Heaviside function and V is a large perturbation with $(1 + |x|^2)V \in L^1(\mathbb{R})$. This kind of step-like potential appears in basic physical models (barrier potentials) and in evolution equations on a Schwarzschild background when written in Regge-Wheeler coordinates. (Joint work with S.Selberg (Trondheim)).