Dispersion for 3D wave equation with a potential in an exterior domain

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Abstract: Let Ω be an exterior domain of $\mathbb{R}^3$ such that $\mathbb{R}^3 \setminus \Omega$ is compact and $0 \notin \overline{\Omega}$. Throughout this talk, we will always assume that $\mathbb{R}^3 \setminus \Omega$ is convex. We consider the initial-boundary value problem, for a function $u = u(t, x)$:

$$\partial_t^2 u - \Delta u + V(x)u = F(t, x), \quad t \neq 0, \quad x \in \Omega, \tag{1}$$

with the initial condition

$$u(0, x) = f_0(x), \quad \partial_t u(0, x) = f_1(x), \tag{2}$$

and the boundary condition

$$u(t, x) = 0, \quad t \in \mathbb{R}, \quad x \in \partial\Omega. \tag{3}$$

We will always assume that V is a real-valued measurable function on Ω satisfying

$$-c_0|x|^{-\delta_0} \leq V(x) \leq c_1|x|^{-\delta_0}$$

for some constants $0 < c_0 < 1/4$, $c_1 > 0$ and $\delta_0 > 3$. The purpose of this talk is to give the dispersive and Strichartz estimates for (1)–(3).