1073-35-129 **Marius Beceanu*** (mbeceanu@math.rutgers.edu), 110 Frelinghuysen Rd., Rutgers University Math. Dept., Piscataway, NJ 08854. *Structure of wave operators in R^d.*

We prove a structure formula for the wave operators in $\mathbb{R}^3$

$$W_\pm = \lim_{t\to\pm\infty} e^{it(-\Delta+V)} P_c e^{it\Delta}$$

and their adjoints for a scaling-invariant class of scalar potentials $V \in B$,

$$B = \Big\{ V | \sum_{k\in\mathbb{Z}} 2^{k/2} \|\chi_{|x|\in[2^k,2^{k+1}]}(x)V(x)\|_{L^2} < \infty \Big\},$$

under the assumption that zero is neither an eigenvalue, nor a resonance for $-\Delta + V$.
The formula implies the boundedness of wave operators on L^p spaces, $1 \leq p \leq \infty$, on weighted L^p spaces, and on Sobolev spaces, as well as multilinear estimates for $e^{itH}P_c$.
When V decreases rapidly at infinity, we obtain an asymptotic expansion of the wave operators. The first term of the expansion is of order $\langle y\rangle^{-4}$, commutes with the Laplacian, and exists when $V \in \langle x\rangle^{-3/2-\epsilon}L^2$.
We also prove that the scattering operator $S = W_-^* W_+$ is an integrable combination of isometries.
The proof is based on an abstract version of Wiener's theorem, applied in a new function space. (Received July 30, 2011)