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On an Inverse Theory for Schrödinger's Operator in Momentum Space for Certain $L_2(R^3)$ Hölder Continuous Potentials Preliminary report.

Let $H = H^0 + V$ be the Schrödinger operator on $L_2(R^3)$ in the momentum representation $H^0u = \rho^2 u, Vu = \int v(k - k')u(k')dk', k = \rho\hat{k}, |\hat{k}| = 1, -\infty < \rho < \infty, \langle \hat{k}|\alpha\rangle \geq 0, \alpha = (0, 0, 1)$. K will be an integral operator $Ku = \int K(k, k')u(k')dk', dk = d\rho d\hat{k} = d\rho \sin\theta d\theta d\phi, u(k) \in L_2(R^3 : d\rho d\hat{k})$ =**H**. $\rho K(k, k')\rho'$ on **H** corresponds to K(k,k') on $L_2(R^3 : \rho^2 d\rho d\hat{k})$. We suppose a weight operator $I + \Omega$ given where $\Omega = (-2\pi i)t(k, k' : (\rho' + i0+)^2)(\rho'/2)\delta(\rho + \rho')$ and $t(k, k' : z)$ is Hölder continuous on $L_2(R^3)$. Let $K^{(j,k)} = (2\pi i)^{-2} \int\int((-1)^j l_1 + io+)^{-1}((-1)^k l_2 - io+)^{-1}K((\rho + l_1 + (-1)^{j+k}l_2)\hat{k}, (\rho' + l_2)\hat{k}')dl_1 dl_2$ $j, k = 0, 1$, $K_- = \Sigma_k(K^{(0,k)} + (K^{(1,k)})^*)$, $K_+ = (K)^*, K = K_- + K_+$. If $(\rho^\beta\Omega) \in \mathbf{H} \otimes \mathbf{H}$, $\beta = 0, 1, 2$ $||\Omega|| < 1$, then the Gelfand-Levitan equation $K + \Omega + (K_-\Omega)_- + (\Omega K_+)_+ = 0$ has a solution in **H**⊗**H** and $v(k - k')$ ∈**H**⊗**H** is given by $v(k - k') = (\rho - \rho')(\pi i)^{-1} \int K((\rho + 1)\hat{k}, \rho' + 1)\hat{k}')dl$.

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