1044-35-178   **Y. Karpeshina*** (`karpeshi@math.uab.edu`), Dept.of Mathematics, UAB, 1300 University blvd, Birmingham, AL 35294. *Zero-range model of p-scattering by a potential well.*

The method of point-range potentials is widely used in quantum mechanics. This method consists of replacing a deep potential well of a small radius by a boundary condition at the point of the centrum of the well . However, in passing to the limit from a deep and narrow potential well to the zero-range model, information, concerning p-scattering and scatterings of higher orders, gets lost. The zero-range model describes approximately only bound states and s-scatterings.

The principal mathematical difficulty, which arises in the mathematical construction of a zero-range potential, considering p-scattering, is that p-scattering waves have a square nonintegrable singularity at the point where the well is located. That is why it is not possible to construct directly an energy operator in $L_2(R^3)$. We construct the energy operator being selfadjoint in some Hilbert space, which naturally arises from the problem and includes $L_2(R^3)$. We construct the complete system of eigenfunctions in this space. (Received September 01, 2008)