ON THE SPECTRA OF PSEUDORELATIVISTIC ELECTRONS HAMILTONIANS IN THE SPACES OF FUNCTIONS, HAVING FIXED PERMUTATIONAL AND POINT SYMMETRY

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Let H be the energy operator of the system $Z = (1, 2, \ldots, n)$ of n PSEUDOrelativistic electrons in the potential field of m nuclei, having infinitely heavy masses, e and r_j be the charge and radius-vector of j-th electron, q_i be the charge of i-th nucleus, $Q = ne + q_1 + \ldots + q_m$ be the total charge of the system Z. We assume, that nuclei location generates the system Z symmetry with respect to the transformations of some finite subgroup $F = f$ of the rotation group $O(3)$. Let a and c be the types of irreducible representations $D_h(a)$ and $D_f(c)$ of the groups S_n of permutations n electrons and F respectively, $B(a, c)$ be the subspace of such functions $u(r)$, $r = (r_1, \ldots, r_n)$, from $L_2(R^{3n})$, which are transformed by the operators T_g, $T_g u(r) = u(g^{-1}r)$, $g = hf$, according to the tensor product of irreducible representations $D_h(a) \times D_f(c)$; at last let $H(a, c)$ be the restriction of the operator H to the subspace $B(a, c)$.

In this talk we investigate the spectrum structure of the operator $H(a, c)$ at any a, c. The following results are obtained.

1. We discover the location of the essential spectrum of the operator $H(a, c)$.

2. We prove, that if Q is not negative, then the discrete spectrum of the operator $H(a, c)$ is infinite.

Before this time the similar results were known only for NONrelativistic electrons (G. Zhislin, E. Mandel, Theor. and Math. Phys. 1969, v. 1, N2, 295–301 (Russian))

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