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V.V.Voronov, V.G.Soloviev

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The semi-microscopic method of calculation of the nuclear level density which is a direct calculation of the number of states with a given I^{π} in a certain energy interval allows one to obtain the fluctuations in the behaviour of the level density. The fluctuations of the density may result in the non-statistical behaviour of a number of characteristics of highly excited states. The investigations performed in ref. (I) show that in the energy dependence of the level density $\rho(E)$ with fixed I^{π} in some spherical nuclei there are large functions up to the neutron binding energy B_n. In the deformed nuclei, as a rule, the fluctuations of the total density for $E \geqslant B_n$ are not large but the density of states with the fixed number of quasiparticles can strongly fluctuate. In the present paper the calculation results of the level density and radiation widths in ^{238}U are given in order to explain the substructures in the behaviour of the radiation strength function in the reaction $^{238}U(\gamma,n)^{237}U$.

In the cross section of the reaction $^{238}U(\gamma,n)$ the peak of 300 KeV width is detected at the excitation energy 6.2 MeV. It is considered to be connected with $E1$ - transitions. According to the quasiparticle selection rule from the ground state of ^{238}U there proceed $E1$ - transitions to the two-quasiparticle components of states with $I^{\pi}=1^{-}$. The radiation strength function for $E1$ - transitions to the $I^{\pi}=1^{-}$ states with the energy E_{λ} is determined by

$$f^{I}_{o\lambda}(E_{\gamma}) = \frac{1}{E_{\gamma}^{3}} \overline{\Gamma}^{I}_{\gamma o\lambda} \rho_{I}(E_{\lambda}) \qquad (I)$$

where $E_\gamma = E_\lambda$, $\rho_I(E_\lambda)$ is the level density with spin I, $\overline{\Gamma}$ is the average radiation width.

The calculation results for the density of two-quasiparticle states with $I^\pi = 1^-$ in ^{238}U are given in Fig.I. It is seen from figure that the density of 1^- states changes noticeably in the interval 5.5 - 7.0 MeV and has a maximum at the energy 6.2 MeV. We have calculated the average radiation width for $E1$ - transitions with the wave functions of the Saxon-Woods potential /3/ and the effective charges for neutrons equal to $e_n = -Z/A$ and for protons equal to $e_p = N/A$. In the calculated radiation widths there is a peak at $E = 6.3$ MeV. The calculated radiation strength function, given in Fig.2, has a number of maxima and minima. There are maxima in the experimental and calculated strength functions at the energy 6.2 MeV. In our calculations we do not consider the fragmentation (the strength distribution) of two-quasiparticle states. The **fragmentation** of two-quasiparticle states over many nuclear levels will result in the decreasing absolute value of the radiation strength function and in certain **smoothing** of fluctuations. We may consider the general picture to be not changed.

The investigations performed lead to the conclusion that the substructure in $E1$ strength function in ^{238}U observed experimentally at the energy 6.2 MeV is connected with the location and structure of two-quasiparticle states. Note, that the large value of the $E1$ strength function at the energy 6.2 MeV coincides also with the peak in the photofission of ^{238}U. One may hope that the description of absolute values

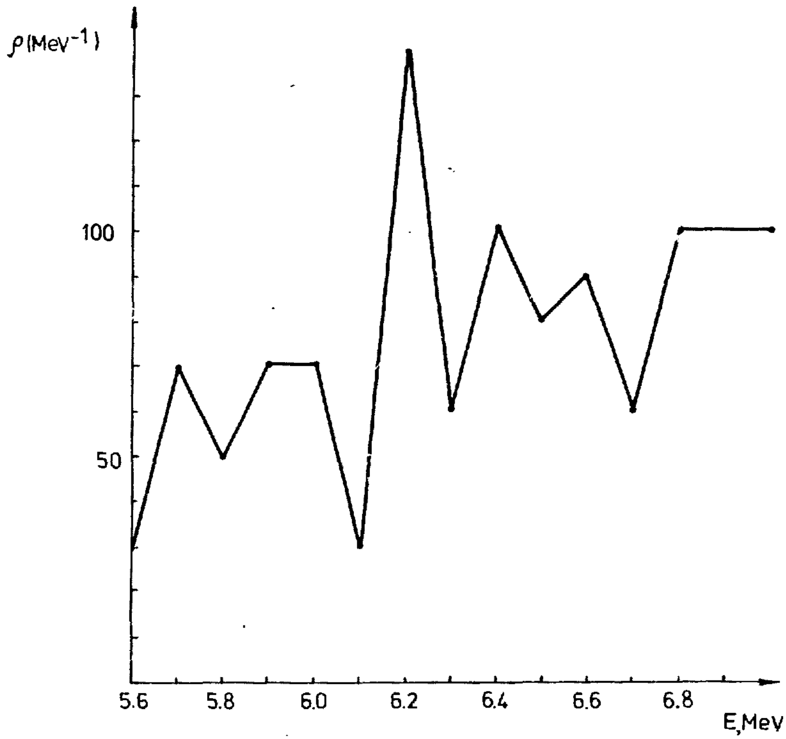

Fig.I The density of two-quasiparticle states with $I^{\pi}=1^{-}$ in ^{238}U, the averaging interval 0.1 MeV.

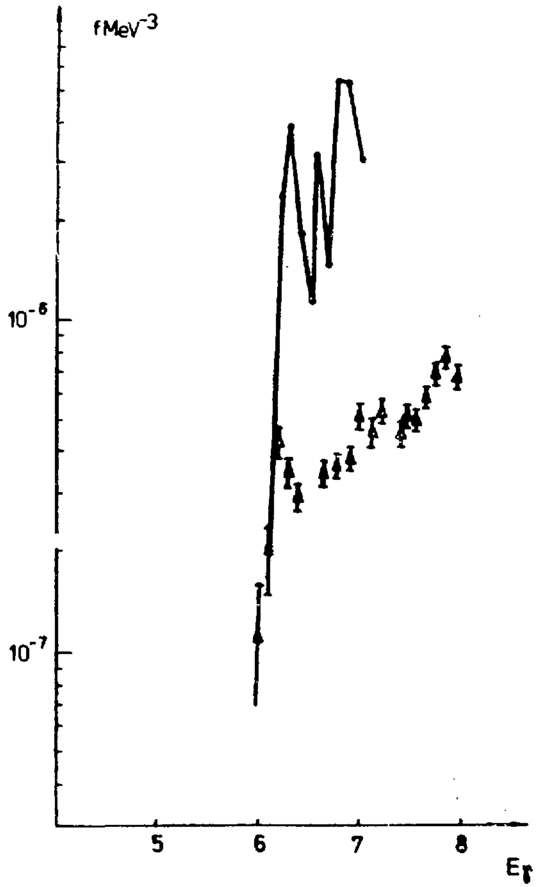

Fig.II The radiation strength function for $E1$- transitions in the reaction $^{238}U(\gamma,n)$; the dots connected by a solid line are calculations; triangles are the experimental dots from the paper.

of the radiation strength functions can be obtained within the model /5/ taking into account the fragmentation of quasi-particle states.

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