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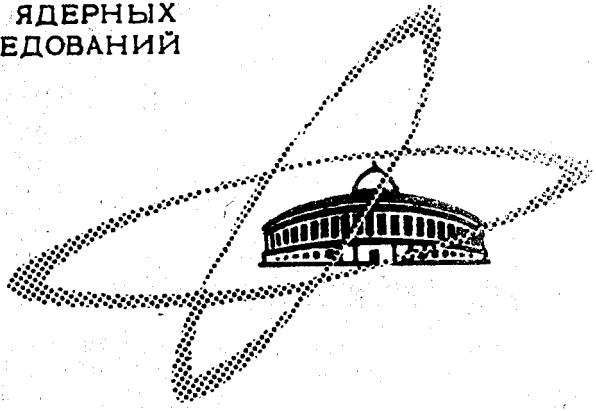

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ON CORRELATIONS BETWEEN REDUCED NEUTRON AND RADIATIVE WIDTHS IN NEUTRON RESONANCES OF COMPOUND ODD-N NUCLEI

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Recently there has been a great growth of interest in observing experimentally the correlations between the reduced neutron widths Γ^0_{ni} and the reduced partial widths $\Gamma^0_{\gamma i f}$ in neutron resonances (see refs. [1-3]). From the theoretical point of view this problem has been considered in refs. [4,5]. In ref. [5] the study of the correlations between Γ^0_{ni} and $\Gamma^0_{\gamma i f}$ has been performed on the basis of the semi-microscopic approach developed in refs. [6,7]. In the present note we consider the cases in which large correlations between Γ^0_{ni} and $\Gamma^0_{\gamma i f}$ in neutron s - and p -resonances for compound odd-N nuclei can occur and which are thus convenient for experimental studies.

The reaction $(n\gamma)$ is assumed to have two stages: first the neutron capture and then $E1$ or $M1$ transitions. Following refs. [5,7] correlations occur when the main contribution to both processes comes from the same components of the wave functions of highly excited states (resonances). The largest correlations should be expected in nuclei the strength functions of which for s - and p -neutrons are large.

In the case of odd-N spherical nuclei produced after s -neutron capture essential correlations between Γ^0_{ni} and $\Gamma^0_{\gamma if}$ for $E1$ transitions should be expected in nuclei with low-lying one-quasiparticle $p_{1/2}$ and $p_{3/2}$ states. The following compound nuclei belong to them: ^{51}Cr , ^{53}Cr , ^{55}Cr , ^{55}Fe , ^{59}Fe , ^{59}Ni ^{61}Ni , ^{63}Ni , ^{65}Ni , ^{143}Ce , ^{145}Ce , ^{191}Pt , ^{195}Pt , ^{195}Hg , ^{197}Hg, ^{199}Hg, ^{201}Hg and others.

In ref. /3/ for 12 resonances a correlation $R = 0{,}80$ between Γ^0_{ni} and $\Gamma^0_{\gamma if}$ for $E1$ transitions to the low-lying states in ^{51}Cr , ^{53}Cr , ^{55}Cr and ^{61}Ni has been observed.

In odd-N deformed nuclei produced after s -neutron capture there may exist noticeable correlations between Γ^0_{ni} and $\Gamma^0_{\gamma if}$ for $E1$ transitions to the low-lying $K^\pi = 1/2^-$ and $3/2^-$ states. The most favourable for large correlations are the following compound nuclei ^{155}Sm , ^{155}Gd , ^{157}Gd , ^{159}Gd , ^{157}Dy , ^{159}Dy , ^{169}Er , ^{171}Yb, ^{181}Hf , ^{183}W , ^{187}Os and others.

In the case of p -neutron capture appreciable correlations may be between Γ^0_{ni} and $\Gamma^0_{\gamma if}$ for $E1$ transitions to the low-lying $s_{1/2}$ and $d_{3/2}$ states having large strength functions for p -neutrons. They comprise the following compound nuclei: ^{87}Kr , ^{89}Sr , ^{89}Zr , ^{95}Zr , ^{93}Mo , ^{95}Mo , ^{97}Mo , ^{99}Mo , ^{101}Mo , ^{93}Ru , ^{101}Ru , ^{103}Ru , ^{103}Ru , ^{103}Pd , ^{105}Pd , ^{107}Pd , ^{111}Cd and ^{113}Cd . In refs. /8,9/ it is shown that in the p -capture by the nuclei ^{92}Mo and ^{98}Mo and in the $E1$ decay of these resonances the one-quasiparticle components of the wave functions of highly excited states (resonances) are clearly revealed.

It is interesting to perform experiments on correlations between reduced neutron and radiative widths in neutron resonances for the nuclei mentioned.

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