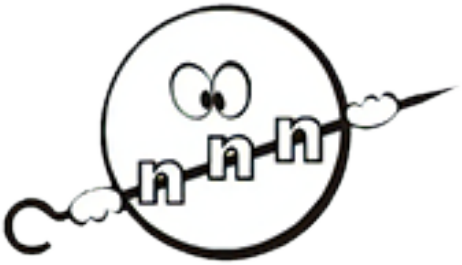

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Non-Statistical Effects in (p, γ) Reactions and in β-Decays

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The characteristics of various nuclear processes are rather simple to calculate in statistical model [1,2]. In particular, the transition-width distribution is described by the Porter–Thomas equation, there are no correlations between different partial widths, the strength function of β-transitions $S_\beta(E)$ depends smoothly on energy, and the ratios of the amplitudes for decay via various spin channels follow the Cauchy distribution. Deviations from the statistical theory have been observed in (p,p' γ) and (p,γ) reactions, β^- and β^+/EC-decays [1-4]. Non-statistical effects are closely related to the symmetry of the nuclear interaction and intermediate resonance structure [3,4].
In this report non-statistical effects manifested in reactions involving low-energy protons and in β- decay are analyzed. In (p,γ) reactions for non-analog resonances in N>Z nuclei non-statistical effects are connected with neutron excess and domination of the simple configuration such as proton-particle neutron-hole in the wave function of nonanalog resonances [1-3]. The association of non-statistical effects in (p,γ) reactions and in the β-decays with spin–isospin $SU(4)$ symmetry are discussed. The non-statistical effects taking into account non-statistical correlations in $E2$ and $M1$ γ-transitions for the γ-decay of the non-analog resonances in (p,γ) reactions are analysed.

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