



THE THIRD INTERNATIONAL FORUM
PHYSICS – 2024



Samarkand, Uzbekistan

April 23-25, 2024

BOOK OF ABSTRACTS

FORUM ORGANIZERS:

Academy of Sciences of the Republic of Uzbekistan
Institute of Nuclear Physics of Uzbekistan Academy of Sciences
Samarkand State University named after Sharof Rashidov
Institute of Engineering Physics of Samarkand State University



Tashkent - 2024

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**STRUCTURE OF
MATTER AND THE
UNIVERSE**

bands from $K^\pi = 0^-$ to spin $I = 21\hbar$, $K^\pi = 1^-$ to $I = 5\hbar$, $K^\pi = 2^-$ to $I = 3\hbar$ and $K^\pi = 3^-$ to $I = 7\hbar$. In the ^{236}U nucleus, experimental data for the ratios $R_{IK} = B(E1; IK \rightarrow (I+1)gr) / B(E1; IK \rightarrow (I-1)gr)$ are known only for transitions from the octupole states $IK^\pi = 10^-, 11^-$ and 31^- .

In ^{238}U the lowest band with a head energy $E_0 = 680$ keV with $K^\pi = 0^-$ is traced to spin $I = 33\hbar$. In the band with $K^\pi = 1^-$, with a head energy $E_1 = 931$ keV, levels with even spins known up to $I = 28\hbar$ and with odd to $I = 3\hbar$. The given probabilities of dipole electrical transitions are known only from the head levels $K^\pi = 0^-$ and 1^- bands. The relationships of E1-transitions from $K^\pi = 0^-$ the band are known before spin $I = 15\hbar$.

In this work, the energies and electrical characteristics of the octupole states of $^{236,238}\text{U}$ nuclei are studied within the framework of the phenomenological model [3-5], which takes into account the Coriolis mixing of the states of rotational bands. The energies and structure of states of rotational bands with bases $K^\pi = 0^-, 1^-, 2^-, 3^-$ and the probabilities of dipole E1- transitions from these states are calculated. Theoretical values of energies, reduced probabilities of E1-transitions and their ratios are compared with experimental data. The agreement between experimental data and theoretical results is good.

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ANALYSIS OF ENERGY AND ELECTRICAL E2-TRANSITIONS OF POSITIVE PARITY STATES OF ISOTOPES $^{182,184}\text{W}$

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Complete results on $^{182,184}\text{W}$ nuclei are presented in [1,2]. In [3], using the Coulomb excitation method with projectiles ^{58}Ni and ^{136}Xe , the quadrupole collectivity in these nuclei was studied and reduced of electromagnetic matrix elements for low-lying states was experimentally determined. In a separate experiment, the lifetimes were measured for five and eight states ^{182}W and ^{184}W , respectively, using the recoil method after Coulomb excitation by a projectile ^{58}Ni with an energy of 245 MeV. These lifetime measurements are in good agreement with the Coulomb excitation yield measurements. The correlation of the extracted E2 matrix elements is discussed within various collective models.

Experimental values of the energy and probabilities of electrical transitions indicate the presence of deviations from the adiabatic theory.

In [4], a theoretical analysis of the nonlinearity of Mikhailov graphs for interband transitions was carried out. The results obtained on the spectral and electromagnetic properties of tungsten nuclei, the Mikhailov plot for $\gamma \rightarrow gr$ transitions in the ^{182}W nucleus has a clearly nonlinear character. Within the framework of perturbation theory, it was shown that the anomaly for interband E2-transitions is due to strong mixing of nearby $\beta -$ and $\gamma -$ vibrational states and the difference in the internal quadrupole moments of the bands.

In this work, the energy and electromagnetic properties of the states of positive parity of $^{182,184}W$ nuclei are studied within the framework of a phenomenological model [5-7], which takes into account the Coriolis mixing of states of low-lying rotational bands. The energy, level structure, and reduced probabilities of intraband and interband transitions from $\beta -$ and $\gamma -$ vibrational states are calculated. It is shown that the main contribution to the interband probabilities of E2 transitions comes from the m.e. describing transitions between the internal wave functions of the main and other bands included in the basis of the model Hamiltonian. Contribution of part of m.e. associated with internal quadrupole moments is not significant. The calculated values of energies, reduced probabilities E2-transitions and their ratios are compared with existing experimental data, which provide good agreement.

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COMPARISON OF QUASIFISSION FRAGMENTS IN THE $^{12}C+^{204}Pb$ AND $^{48}Ca+^{168}Er$ REACTIONS

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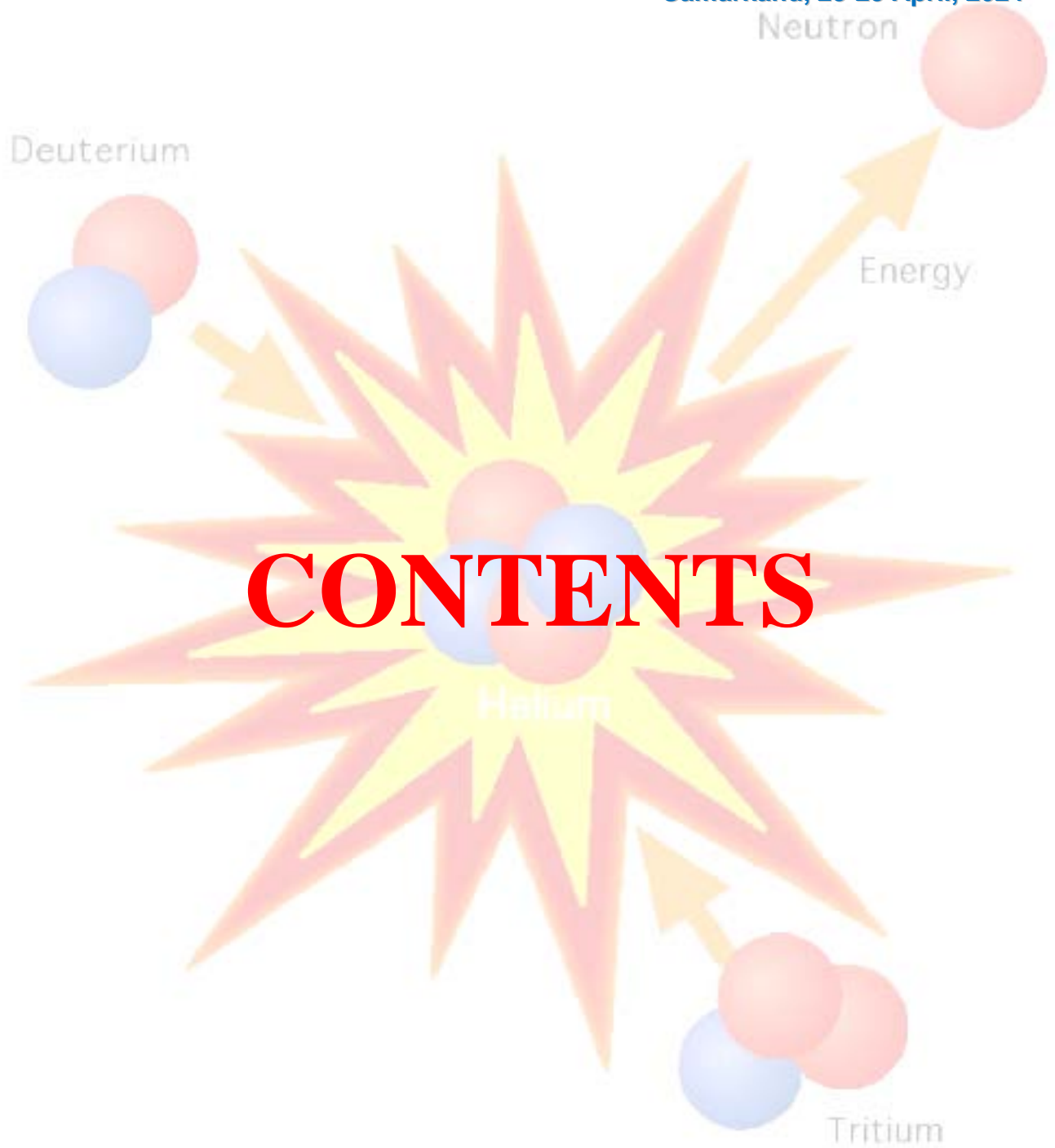
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One of the problems of modern physics is for the synthesis of the extremely heavy chemical elements, therefore, the investigation of the target and projectile pair and corresponding range of the beam energy leading to as possible large cross sections of the evaporation residues is an important aim of researchers of nuclear physics.

The experimental and theoretical studies of the peculiarities of the processes occurring in heavy ion collisions are important to establish complete fusion mechanism. It can be done by the

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