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Investigation of dibaryons in a nuclear matter using the OpenMP implementation of the calculation of the three-particle force potential

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The properties of six-quark dibaryons in a nuclear medium are investigated in relation to the description of light nuclei with A = 6. The formation of dibaryons in nuclei leads to the appearance of a three-body force between the dibaryon and the nuclear core, which makes an additional contribution to the binding energy of the three bodies, improving the agreement with the observed physical parameters. To solve the many-particle Schrödinger equation, a variational method was used in the framework of the $\alpha + 2N$ cluster model. The cluster wave function was represented as a superposition of multidimensional non-orthogonal Gaussian functions, which makes it possible to analytically represent the matrix elements of the Hamiltonian from single-particle operators. Since the interaction potential is nonlocal in the presence of a three-particle force, the three-particle forces were calculated numerically. The use of OpenMP technology has made it possible to significantly speed up the calculation of the matrix elements of three-particle forces, which requires significant computer time. The calculations were carried out on the heterogeneous platform HybriLIT MICC LIT JINR.

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