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ВРАХУВАННЯ ПОЗДОВЖНЬОЇ КОМПОНЕНТИ ПЕРЕДАНОГО ІМПУЛЬСУ Q_z ТА ПОПЕРЕЧНОГО ВІДНОСНОГО ІМПУЛЬСУ p_{\perp} У ДИФРАКЦІЙНОМУ ПІДХОДІ ДО РЕАКЦІЙ $H(d, p)X$

У рамках наближення Глаубера - Ситенка проаналізовано диференціальний переріз розпаду дейтрона з виходом протона при малих кутах ($\theta_p < 7$ мкрад). Використано параметризації хвильової функції дейтрона: один гаусіан, а також моделі на основі NN-потенціалів K2, Av18 і Nijm I.

Досліджено вплив поздовжніх компонент імпульсу ($|Q_z| \leq 0,5$ Гев/с) та поперечного імпульсу пари протон-нейтрон ($|p_{\perp}| < 0,5$ Гев/с) в антилабораторній системі. Результати порівняно з експериментом у діапазоні $k_z = p_3^* = 0,25 - 0,5$ Гев/с, де очікується прояв кваркових ефектів. Попередні оцінки показують збільшення перерізу зі зростанням p_{\perp} та зсув і посилення максимуму при врахуванні Q_z .

Ключові слова: дейтрон, дифракційний розпад, релятивістські ефекти, кваркова структура, переріз реакції, підхід Глаубера - Ситенка, антилабораторна система, поздовжній імпульс, поперечний імпульс, дибаріон, $d^*(2380)$.

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INCLUSION OF THE LONGITUDINAL COMPONENT OF THE TRANSFERRED MOMENTUM Q_z AND THE TRANSVERSE RELATIVE MOMENTUM p_{\perp} IN THE DIFFRACTION APPROACH TO THE $H(d, p)X$ REACTIONS

In this work, within the framework of the Glauber - Sitenko approximation, we present an analysis of the differential cross section for deuteron breakup with proton emission in the reaction $H(d, p)X$ at small proton emission angles ($\theta_p < 7$ μ rad). The study employs several parameterizations of the deuteron wave function, including the single-Gaussian, the multi-Gaussian K2 parameterization, and models based on the Av18 and Nijm I nucleon-nucleon potentials.

Particular attention is paid to the effects of small longitudinal components of the transferred momentum ($|Q_z| \leq 0.5$ GeV/c in the laboratory frame) and the transverse momentum of the proton-neutron pair ($p_{\perp} = (p_x, 0) \leq 0.5$ GeV/c) in the antilaboratory reference frame. The results are compared with available experimental data, especially in the region of longitudinal momenta $k_z = p_3^* = 0.25 - 0.5$ GeV/c (in the antilaboratory frame), where quark effects are expected to become significant. Calculations show an increase in the differential cross section with increasing transverse momentum, as well as a small shift – and a noticeable enhancement – of the cross-section maximum when the longitudinal component Q_z is included.

Keywords: deuteron, diffractive breakup, relativistic effects, quark structure, differential cross section, Glauber - Sitenko approach, longitudinal momentum, transverse momentum, dibaryon, $d^*(2380)$.

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