

XXV International Baldin Seminar on High Energy Physics Problems
"Relativistic Nuclear Physics and Quantum Chromodynamics"



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on High Energy Physics Problems
Relativistic Nuclear Physics & Quantum Chromodynamics
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Relativistic field-theoretical approach of the vector meson resonance production in reaction $A + B \Rightarrow V + X \Rightarrow 1 + 2 + X$ and determination of the location of the spin quantization axis of the vector meson-resonance V via the cross sections of the subreactions $A + B \Rightarrow V + X$ and $V \Rightarrow 1 + 2$

Friday, 22 September 2023 12:40 (20 minutes)

Field-theoretical approach of the vector meson resonance production in reaction $A + B \Rightarrow V + X \Rightarrow 1 + 2 + X$ is applied to the determination of location of the V -meson spin quantization axis.

In this approach amplitude of the reaction $A + B \Rightarrow 1 + 2 + X$ is a product of the on shell and off shell amplitudes of the subreactions $A + B \Rightarrow V + X$ and $V \rightarrow 1 + 2$ correspondingly.

Off shell behavior of the V -meson decay amplitude ensures separability of the amplitude $A + B \Rightarrow 1 + 2 + X$ and indicates the need to take into account the decay width of the V -meson resonance. The 3D time-ordered relativistic field-theoretical equations are suggested for the off shell V -meson decay amplitude $V \rightarrow 1 + 2$.

It is shown that the special cases of the considered formulation were used in numerous high energy experiments in order to study of asymmetries and alignment of the particles 1 and 2 in reactions $A + B \Rightarrow V + X \Rightarrow 1 + 2 + X$.

Special attention is given to the partial wave decomposition of the relativistic amplitudes and cross section over the the orbital moments and spin of the intermediate V -meson and final particles 1 and 2. Equivalence of this partial wave decomposition and Jacob-Wick decomposition is considered.

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