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



Contribution ID: 162

Type: not specified

Relativistic field-theoretical approach of the vector meson resonance production in reaction $A + B \Longrightarrow V + X \Longrightarrow 1 + 2 + X$ and determination of the location of the spin quantization axis of the vector meson-resonance V via the cross sections of the subreactions $A + B \Longrightarrow V + X$ and $V \Longrightarrow 1 + 2$

Friday 22 September 2023 12:40 (20 minutes)

Field-theoretical approach of the vector meson resonance production in reaction $A + B \Longrightarrow V + X \Longrightarrow 1 + 2 + X$ is applied to the determination of location of the V-meson spin quantization axis. In this approach amplitude of the reaction $A + B \Longrightarrow 1 + 2 + X$ is a product of the on shell and off shell amplitudes of the subreactions $A + B \Longrightarrow V + X$ and $V \to 1 + 2$ correspondingly. Off shell behavior of the V-meson decay amplitude ensures separability of the amplitude $A + B \Longrightarrow 1 + 2 + X$ 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 $V \to 1 + 2$.

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 $A + B \Longrightarrow V + X \Longrightarrow 1 + 2 + X$.

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.

Author: MACHAVARIANI, Alexander (LHEP JINR)

Presenter: MACHAVARIANI, Alexander (LHEP JINR)

Session Classification: Parallel: Polarization phenomena, spin physics