

Explanations for the $d^*(2380)$ Dibaryon Peak

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We study the two step sequential one pion production mechanism, $np(I = 0)^- pp$, followed by the fusion reaction $pp \rightarrow {}^+d$, in order to describe the $np \rightarrow {}^+d$ reaction with ${}^{+-}$ in $I = 0$, where a narrow peak, so far identified with a “ $d(2380)$ ” dibaryon, has been observed. We find that the second step $pp \rightarrow {}^+d$ is driven by a triangle singularity that determines the position of the peak of the reaction and the large strength of the cross section. The combined cross section of these two mechanisms produce a narrow peak with the position, width and strength compatible with the experimental observation within the approximations done. This novel interpretation of the peak without invoking a dibaryon explains why the peak is not observed in other reactions where it has been searched for.

Autori principali: Prof. OSET, Eulogio (UV-IFIC); MOLINA PERALTA, Raquel (UV-IFIC); Dr. IKENO, Natsumi (Tottori University)

Relatore: MOLINA PERALTA, Raquel (UV-IFIC)

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Classificazione della track: Partial wave analyses and baryon resonance parameter extraction