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Remarks Concerning the t' Dependence

I do not understand the t' dependence $N(t')$ shown in Fig.2 Why do we impose $N(t') = 0$ for $t' = 0$ for NPE but *not* for UNPE?

If $t' = 0$, then the reaction is collinear, both in the overall center-of-mass frame and in the resonance rest frame. In this limit, we have the following constraints for the resonance decay angles: the angle θ is well defined, but the angle ϕ is indeterminate (we cannot arbitrarily set $\phi = 0$). So we need to impose the condition that the amplitude be zero in this limit, if it contains a functional dependence on ϕ. So we must demand

$$N(t') \propto t', \qquad \text{if} \quad m \neq 0 \tag{1}$$

where m is the spin z component. It follows, therefore, that the waves $P_\pm$ and $D_\pm$ should conform to the t' dependence as shown in (1), but it does *not* apply to the waves S_0, P_0 or D_0, since these waves do not depend on the ϕ variable.

Am I wrong in my reasoning? If so and if you know of a correct approach to this problem, let me learn from you.

I apologize for neglecting to bring up this question before.