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From muon-catalyzed fusion to electromagnetic formfactors of hyperons

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Deviation of the cross section for the nuclear reaction X(a, b)Y from the Gamow formula due to an interaction additional to the Coulomb one in the entrance channel has been analyzed. It is shown that the reaction cross section has an oscillating structure at low energies. If the maximum of the first oscillation is close to the threshold of the channel a+X, it has a resonance behavior. To analyze the effect, simple relations between the period and the amplitude of the oscillations with parameters of the interaction have been derived. Specifically, they predict the cross-section oscillations of fusion (or muon-catalyzed fusion) reactions of the type X(a,b)Y for slow collisions between nuclei (a) and atomic target (X), as, for example, the reaction D(d,p)T between deuterons (d) and deuterium atoms (D)[1].
This simple formalism is used for analyzing the experimental data on process $e^+ + e^- \to \Lambda_c^+ + \Lambda_c^-$ obtained recently by the BESIII Collaboration [2].

[1] V.S. Melezhik, Nucl. Phys. A550, 223 (1992)
[2] M. Ablikim et. al.Phys. Rev. Lett. 131, 191901 (2023)

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