

Mass and width of Δ resonance using complex-mass renormalization scheme

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Collaboration

Abstract content

We calculate the pole mass and width of the Δ resonance to the third order in chiral effective field theory. We choose the complex-mass renormalization scheme in our calculation and compare the convergence behavior of both the complex-mass scheme (CMS) and the small-scale expansion (SSE) calculating the loop contributions to the delta resonance mass. Contributions of the renormalized loop diagrams for real and imaginary part of the pole of delta resonance are represented graphically depending on the pion mass. We show that a consistent power counting scheme can be obtained within the CMS, independently of counting the mass difference $\delta = m_\Delta - m_N$ as a small quantity of chiral order q as in the SSE.

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