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On calculating disconnected-type hadronic light-by-light scattering diagrams from lattice QCD

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The first-principles calculation of the hadronic light-by-light scattering (HLbL) contribution is the most critical issue in the theory of the muon $g - 2$ to confront the standard model prediction with the more accurate experimental result to be provided in the next five years. The feasibility of the lattice QCD computation of the HLbL contribution has been demonstrated for the “connected diagram” where four electromagnetic (EM) vertices appear on a single quark loop. In this talk, we focus on “disconnected diagrams” where the four EM vertices are distributed over more than one quark loop. We note that any method to calculate the disconnected diagrams requires subtraction of unwanted contributions which may affect its feasibility. We present an example of the method with a concrete realization for such a subtraction.

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