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Two-loop matching relations in the SM

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We study the relationships between the basic parameters of the on-shell renormalization scheme and their counterparts in the $\overline{\text{MS}}$ scheme at full order $\mathcal{O}(\alpha^2)$ in the Standard Model. These enter as threshold corrections the renormalization group analyses underlying, e.g., the investigation of the vacuum stability. To ensure the gauge invariance of the parameters, in particular of the $\overline{\text{MS}}$ masses, we work in R_ξ gauge and systematically include tadpole contributions. We also consider the gaugeless-limit approximation and compare it with the full two-loop electroweak calculation.

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