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The Electric Dipole Moment of electron induced by Electroweak Multiplets at full Three-loop

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There has been remarkable progress in recent years in the electric dipole moment (EDM) measurements of electron using paramagnetic atom or molecule. In a previous study, we calculated the contribution to the electron EDM induced by the CP-violating Yukawa interaction of electroweak multiplets at the three-loop level in effective field theory. We found that this contribution might reach the sensitivity of future EDM experiments. However, this calculation involves an uncertainty relating to threshold corrections that cannot be evaluated in the effective field theory. In this study, we calculate the electron EDM induced by electroweak multiplets at full three-loop. As a result, we found that the threshold correction contributes at the same order as the result of the effective field theory and that the full result is larger than the previous study.

Presenter: OGAWA, Kiyoto

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