Tuesday, Feb 24, **4:15pm** I PAB 4-708 I Zoom: 517 486 4983

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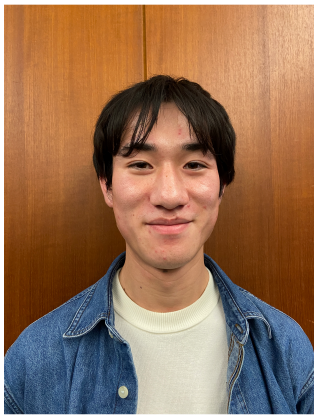

Full Three-Loop Electroweak Multiplet Contributions to the Electron Electric Dipole Moment

Experimental sensitivity to the electric dipole moment (EDM) of the electron has improved remarkably in recent years. Consequently, future prospects could probe new physics whose contribution to the electron EDM first arises at three-loop order. Additional SU(2)$_L$ multiplets with CP-violating Yukawa interactions, which contribute to the electron EDM at three-loop level, is one such testable new physics scenario. In this scenario, the electron EDM is radiatively induced from two contributions: the CP-odd trilinear W-boson coupling, called the electroweak-Weinberg operator, and the CP-odd dipole operator of electron. The former and the latter operators are generated at two-loop and three-loop levels, respectively, after integrating out the SU(2)$_L$ multiplets. Within the same models, according to an analysis based on the Standard Model Effective Field Theory (SMEFT), we previously found that the contribution to the electron EDM from the electroweak-Weinberg operator can be probed in future experiments. However, the one-loop matching condition between the electron EDM and the electroweak-Weinberg operator does not receive a large logarithmic enhancement because the associated anomalous dimension is zero. The CP-odd dipole operator of the electron would contribute to the electron EDM at the same three-loop order as the contribution through the electroweak-Weinberg operator. In this talk, we discuss the electron EDM induced by the CP-violating Yukawa interactions of the SU(2)$_L$ multiplets at full three-loop level. A central result is that the full three-loop calculation is a factor of three larger than that of the electroweak-Weinberg operator alone. We will talk based on JHEP 02 (2025) 082 and arXiv 2602.11888 .