Alternative minimal SO(10) GUT and the Seesaw Scale. (Mod.Phys.Lett. A33 (2018) no.29, 1850167)

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Alternative renormalizable minimal non-SUSY SO(10) GUT model is proposed. Instead of a **126**-dimensional Higgs field, a **120**-dimensional Higgs filed is introduced in addition to a **10**-dimensional Higgs field and plays a crucial role to reproduce the realistic charged fermion mass matrices. With contributions of **120** Higgs field, the original Witten's scenario of inducing the right-handed Majorana neutrino mass through 2-loop diagrams becomes phenomenologically viable. This model inherits the nice features of the conventional renormalizable minimal SO(10) GUT model with $\mathbf{10}+\overline{\mathbf{126}}$ Higgs fields, while supplemented with a low scale seesaw mechanism due to the 2-loop induced right-handed Majorana neutrino mass.

High Precision Estimats of $g-2$ and EDM in General Spin Precession in Storage Ring(Phys.Lett. B786 (2018) 45-52)

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We analyse the systematic uncertaities on the spin precession of particles in the storage ring, especially in the muon g-2/EDM project. There particles have both anomalous magnetic moments (g-2) and elctric dipole moments(EDM), and their positions and velocity directions have both $O(10^{-3}-10^{-4}) \equiv O(\epsilon)$ extensions. In order to measure these dipole moments up to 0.1ppm or more we determine the precession frequency up to $O(\epsilon^2)$. Our analytical formulation includes the Farley's pitch correction in the special case and can be applied to more general experimental setups.

A New Approach for Measuring the Muon Anomalous Magnetic Moment and Electric Dipole Moment (accepted for publication in PTEP)

muon g-2/EDM Collaboration

This paper introduces a new approach to measure the muon magnetic moment anomaly $a_\mu = (g-2)/2$, and the muon electric dipole moment (EDM) d_μ at the J-PARC muon facility. The goal of our experiment is to measure a_μ and d_μ using an independent method with a factor of 10 lower muon momentum, and a factor of 20 smaller diameter storage-ring solenoid compared with previous and ongoing muon g ? 2 experiments with unprecedented quality of the storage magnetic field. Additional significant differences from the present experimental method include a factor of 1,000 smaller transverse emittance of the muon beam (reaccelerated thermal muon beam), its efficient vertical injection into the solenoid, and tracking each decay positron from muon decay to obtain its momentum vector. The precision goal for a μ is statistical uncertainty of 450 part per billion (ppb), similar to the present experimental uncertainty, and a systematic uncertainty less than 70 ppb. The goal for EDM is a sensitivity of 1.5×10^{-21} e ・ cm.