

Erratum

Oral Presentation

Standard Model of Particle Physics with Four Chiral Generations

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The simple extension of Standard Model by including one more generation of chiral fermions is discussed. The room for one extra generation is highly constrained from experimental searches as well as cosmology. The discussion covers issues of generating mass of four generation fermions by enlarging the Higgs structure or including additional symmetries. We also discuss issues of perturbativity of couplings in four generation models as well as the cosmological implications of fourth generation neutrinos

Poster Presentation

DEFECTS INDUCED MAGNETISM IN GaN:Gd LAYERS grown by RMBE

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Ferromagnetism above room temperature and colossal magnetic moment has been recently observed in Gd:GaN epilayers. But the origin of the observed phenomena is not clear. In order to understand the mechanism, wavelength dependence of the photoconductivity and the photo-thermoelectric power is studied in Gd:GaN layers doped in situ by molecular beam epitaxy (MBE). Our study shows that Gd incorporation produces a large concentration of acceptor-like defects in the GaN lattice. These defect states lie ~ 450 meV above the valence band. The concentration of these defects increases with Gd concentration. The structural and the magnetic properties of GaN implanted with Gd is also investigated. Magnetic moment per Gd ion in implanted layers observed to be an order of magnitude higher compared to GaN:Gd layers doped in situ. Annealing at higher temperatures reduces the saturation magnetization. This finding clearly suggests that saturation magnetization and the defect density observed in implanted samples are correlated. A model has been proposed to explain colossal magnetic moment per Gd ion and the ferromagnetism observed in this system in terms of the formation of giant defect cluster around each Gd ion.