

Predictions of a fundamental statistical picture

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The discovery of a Higgs boson at the electroweak scale appears to point toward supersymmetry, as the most likely mechanism for protecting a scalar boson mass from enormous radiative corrections. The earlier discovery of neutrino masses similarly appears to point toward grand unification of nongravitational forces, which permits (for neutrinos) Majorana masses, Dirac masses, and a seesaw mechanism to drive the observed masses down to low values. A third major discovery, cosmic acceleration suggesting a relatively tiny cosmological constant, appears to point toward truly revolutionary new physics. Many other problems and mysteries also indicate a need for fresh ideas at the most fundamental level. Here a picture is proposed in which standard physics and its extensions are obtained (through a nontrivial set of arguments) from statistical counting and the local geography of our universe [1]. The unavoidable predictions include supersymmetry (at some energy scale), $SO(N)$ grand unification, a drastic diminishing of the usual cosmological constant, and a nonsupersymmetric dark matter WIMP which should be detectable within the next several years.

- [1] Roland E. Allen, “Predictions of a fundamental statistical picture”, arXiv:1101.0586 [hep-th] and a paper under review.