

$E(38)$ and $Z_0(57)$: possible surprises in the Standard Model

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With the reported observation of the Higgs boson at the LHC, the Standard Model of particle physics seems to be complete now as for its particle content. However, several experimental data at low and intermediate energies indicate that there may be two surprises.

The strongest evidence concerns $E(38)$, a very light spinless boson, probably a scalar, with a mass of 38 MeV and decaying into two photons. Theoretical arguments and experimental signals supporting its existence will be presented, including a very recent direct experimental confirmation at JINR in Dubna.

The other tentative new boson $Z_0(57)$, with a mass of about 57 GeV, we propose on the basis of small enhancements we observe in several experiments, using recent data obtained at the LHC as well as much older ones from LEP. We interpret this new particle as a pseudoscalar or scalar partner of a composite Z vector boson.

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