

---

**HIGHLIGHTS OF THE 2024 EDITION OF THE REVIEW OF PARTICLE PHYSICS**

All PDG data and review articles are available online at [pdg.lbl.gov](http://pdg.lbl.gov).

869 new papers with 2,717 new measurements
--

120 reviews (most are revised)
--------------------------------

- 320 new measurements from *LHC* experiments (ATLAS, CMS and LHCb).
- Extensive *Higgs boson* coverage from 231 new papers and 557 measurements with latest results on mass, couplings, decay width and branching ratios, plus searches for other neutral and charged Higgs bosons.
- *Supersymmetry*: 36 new papers with 148 measurements with major exclusions.
- *Top quark*: 35 new papers provide latest results on mass, coupling, and the discovery of four top quark production at LHC.
- *W mass*: CDF published a new measurement of the *W* mass. It is more precise than the world average at the time, but the two results disagree. See comments in Particle Listings and our *W* mass review referencing the extensive studies done by the *LHC* TeV  $M_W$  working group.
- *c-, b-hadron physics*: 161 papers and 597 measurements provide world-best data on lifetimes, mixing, CP violation, CKM angles, and constraints on new physics.
- *Neutrino Physics*: 10 new papers with measurements on neutrino mass, mixing, and CP-violation.
- *Meson resonances*: Substantial improvements, including new cross particle fits involving  $J/\psi(1S)$ ,  $\psi(2S)$  and  $\eta_c(1S)$ , merging of  $\pi_1(1400)$  and  $\pi_1(1600)$  with non- $q\bar{q}$  quantum numbers into same node, listing of complex pole positions when available, and inclusion of recently observed states. Several mesons now considered established added to Summary Tables.
- New *naming scheme* for the many recently discovered mesons and baryons with *c* or *b* quarks that are not compatible with conventional  $q\bar{q}$  or  $qqq$  structures. Listed in “Other mesons” and “Exotic baryons” sections.
- Major revision of *Higgs Physics* review summarizes latest LHC results and constraints on new physics.
- Major revision of *Cosmic rays* review, now covering all components of cosmic rays including neutrinos (which were previously discussed in Neutrino Telescopes in Particle Detectors for Non-Accelerator Physics).
- Major revision of *Large time-projection chambers for rare event detection* in Particle Detectors for Non-Accelerator Physics.
- Major revision of *Top Quark* review summarizes latest LHC results and constraints on new physics from top quark.
- Major revision of *Heavy Non- $q\bar{q}$  Mesons* review follows new naming scheme for states not compatible with  $q\bar{q}$  or  $qqq$  structures.
- *Semiconductor detectors* section of Particle Detectors at Accelerators review includes recent developments.
- New section on goodness-of-fit tests and expanded discussion of statistical tests in *Statistics* review.
- Updated EWK fit in *Electroweak Model and Constraints on New Physics* review.
- *Semileptonic B Hadron Decays, Determination of  $V_{cb}$  and  $V_{ub}$*  includes latest results and discusses long-standing issues with inclusive and exclusive measurements.
- Updated cross section results in the *Neutrino Cross Section Measurements* review.
- Updated  $\tau$  decay parameters and branching ratio (BR) fits, including new treatment of  $BR(a_1(1260) \rightarrow \pi\gamma)$ .