Physics Letters B 667 (2008) 1–1340

Contents lists available at ScienceDirect

Physics Letters B

www.elsevier.com/locate/physletb

REVIEW OF PARTICLE PHYSICS*

Particle Data Group

Abstract

This biennial *Review* summarizes much of particle physics. Using data from previous editions, plus 2778 new measurements from 645 papers, we list, evaluate, and average measured properties of gauge bosons, leptons, quarks, mesons, and baryons. We also summarize searches for hypothetical particles such as Higgs bosons, heavy neutrinos, and supersymmetric particles. All the particle properties and search limits are listed in Summary Tables. We also give numerous tables, figures, formulae, and reviews of topics such as the Standard Model, particle detectors, probability, and statistics. Among the 108 reviews are many that are new or heavily revised including those on CKM quark-mixing matrix, V_{ud} & V_{us}, V_{cb} & V_{ub}, top quark, muon anomalous magnetic moment, extra dimensions, particle detectors, cosmic background radiation, dark matter, cosmological parameters, and big bang cosmology.

A booklet is available containing the Summary Tables and abbreviated versions of some of the other sections of this full *Review*. All tables, listings, and reviews (and errata) are also available on the Particle Data Group website: `http://pdg.lbl.gov`.

*The publication of the *Review of Particle Physics* is supported by the Director, Office of Science, Office of High Energy and Nuclear Physics, the Division of High Energy Physics of the U.S. Department of Energy under Contract No. DE–AC02–05CH11231; by the U.S. National Science Foundation under Agreement No. PHY-0652989; by the European Laboratory for Particle Physics (CERN); by an implementing arrangement between the governments of Japan (MEXT: Ministry of Education, Culture, Sports, Science and Technology) and the United States (DOE) on cooperative research and development; and by the Italian National Institute of Nuclear Physics (INFN).

0370-2693/$ – see front matter
doi:10.1016/j.physletb.2008.07.018

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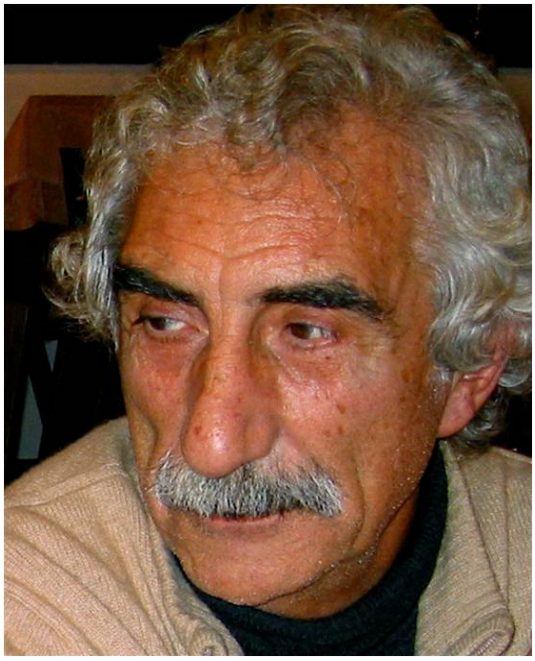
We dedicate this edition of the Review of Particle Physics to the memory of Carlo Caso, a long-time member of the Particle Data Group

Carlo Caso (1940–2007)



For many years, Carlo Caso was an esteemed member of the Particle Data Group. He joined the Group as LEP was starting, and was responsible along with Atul Gurtu for all aspects of the W and Z boson sections. They created the organization of the sections, brought in all the data, carried out fits to the data, and wrote vital reviews. The gauge bosons were at the forefront throughout that era, and the community benefited greatly from their insight and their service.

Carlo's wisdom helped guide the Particle Data Group as a whole. He was always a gentleman and gave freely of his experience and expertise in many ways. Above all, he was a friend to all of us and we will miss him dearly.

Leonardo Rossi of the ATLAS Experiment wrote about Carlo's larger career and, with his permission, we reproduce his comments here.

"Our friend and colleague Carlo Caso passed away on July 7th, after several months of courageous fight against cancer.

"Carlo spent most of his scientific career at CERN, taking an active part in the experimental programme of the laboratory. His long and fruitful involvement in particle physics started in the sixties, in the Genoa group led by G. Tomasini. He then made several experiments using the CERN liquid hydrogen bubble chambers -first the 2000HBC and later BEBC- to study various facets of the production and decay of meson and baryon resonances. He later made his own group and joined the NA27 Collaboration to exploit the EHS Spectrometer with a rapid cycling bubble chamber as vertex detector. Amongst their many achievements, they were the first to measure, with excellent precision, the lifetime of the charmed D mesons. At the start of the LEP era, Carlo and his group moved to the DELPHI experiment, participating in the construction and running of the HPC electromagnetic calorimeter. In DELPHI he contributed significantly to beauty physics measurements and Higgs searches.

"After LEP, his interest turned to LHC and he became an enthusiastic supporter of the ATLAS experiment. He led the Genoa group engaged in the design and construction of the pixel detector and made significant contributions to this effort. He also maintained an active interest in the overall ATLAS experiment and its Collaboration life, and served as Chairman of the ATLAS Publication Committee. It is very sad that Carlo did not live long enough to enjoy the LHC data.

"In parallel with his research, Carlo played an important role as a teacher. Full Professor of Experimental Physics in Genoa, he was able to motivate many students around him. He taught them to love physics, to ask questions and not to be satisfied with a superficial answer. His door was always open and discussions with him were always pleasant and inspiring."

The full text of Rossi's comments may be found at:
`http://aenews.cern.ch/article.php?issueno=200709&date=September%C2%A02007&id=ATL-ENEWS-2007-049`.