



COLLOQUIA DI DOTTORATO, A.A. 2023/2024

Dipartimento di Fisica, A101
Giovedì 14 Marzo 2024 ore 16:00

Measuring the mass of the W boson: a quest for precision

Lorenzo Bianchini
(Università di Pisa)

Since its first observation in the early eighties, the W boson has always found a place in the research program of high-energy colliders. Within the Standard Model (SM) of particle physics, the W boson mass can be predicted from a few observables which have been now measured with high precision: comparing the SM prediction to a sufficiently accurate measurement of the W mass thus provides a consistency test of the model. However, the SM prediction could be broken by quantum corrections induced by new unknown fields, which would actually turn the consistency test into indirect evidence of new physics.

Unfortunately, a precise measurement of the W boson mass at colliders is also extremely challenging for a wealth of reasons, as it is also possibly implied by the neat tension between the two most-precise measurements to date. The CMS experiment at the LHC is now in the process of delivering a new measurement of the W mass. This will come as the result of an impressive amount of work done by researchers (and students!) who have been carefully ticking off all the items on a long task list over the past years. In this talk, a concise overview of the state of the art will be given, focusing on the challenges posed by the quest for precision at the LHC and on some of the solutions that have been worked out along the way.

The seminar is in presence up to the maximum occupancy of the lecture hall.