

LABORATORI NAZIONALI DEL GRAN SASSO

SEMINAR ANNOUNCEMENT

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**The look elsewhere effect
in the interpretation of
particle physics data**

The experimental issue of the search for new particles of unknown mass poses the challenge of exploring a wide interval to look for the usual signatures represented by excesses of events above the background. A side effect of such a broad range quest is that the calculation procedure of the significance of a potential effect, valid for signals of known mass location, is no more applicable when such an information is missing. This circumstance is commonly termed in high energy physics applications as the “look elsewhere effect”. How it concretely manifests in a specific problem of signal hunting depends upon the particular strategy adopted to unravel the sought-after effect from the underlying background. In this respect an increasingly popular method is the profile likelihood ratio, especially because of its asymptotic behavior dictated by one of the most famous results of statistics, the Wilks’ theorem. The seminar is, thus, centered on the description of the look elsewhere effect in the framework of the profile likelihood methodology, with examples of application to the recent LHC data, and with the illustration also of the statistical implications of alternative search approaches.

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