

Cuoricino analysis for background rejection and study of DBD systematics

Cuoricino was an array of 62 bolometric detectors whose main purpose was to study a limit on neutrinoless double beta decay (“ $0\nu\text{DBD}$ ”) of ^{130}Te .

Such rare process is a powerful probe for two of the main uncovered questions concerning neutrinos: their Dirac/Majorana character and their mass hierarchy.

We present the main steps of Cuoricino data analysis: starting from raw pulses and ending to the experimental spectrum where the limit on $0\nu\text{DBD}$ counts is estimated.

More in detail, we will focus on the following parts of the analysis:

- the optimum filter technique applied to raw data, which is used not only for the detector’s resolution improvement but also for pileup rejection and pulse shape recognition.
- the background modeling, showing the main strategies used in Cuoricino to study the weight of all the possible sources that contributes to the spectrum in the region of interest (2.5 - 2.6 MeV), such as environmental and cosmogenical radioactivity or the bulk and surface contaminations of the whole experimental setup.

We will also discuss the statistical tool leading to the estimation of the Cuoricino “ $0\nu\text{DBD}$ ” limit. The latter consists of a maximum likelihood approach fixing an upper bound for this process at 90% C.L. We present also a toy model to investigate its systematic uncertainties such as the dead time of the whole experiment, energy calibration, detector response function and background spectral shape.

Author: Mr CARRETTONI, marco andrea (INFN - universita’ milano-bicocca)

Presenter: Mr CARRETTONI, marco andrea (INFN - universita’ milano-bicocca)