Sensivity studies :status report

Maximilien Fechner

With systematics

Procedure : χ^2 now is a function of X(oscillation) and ε (nuisance parameters)

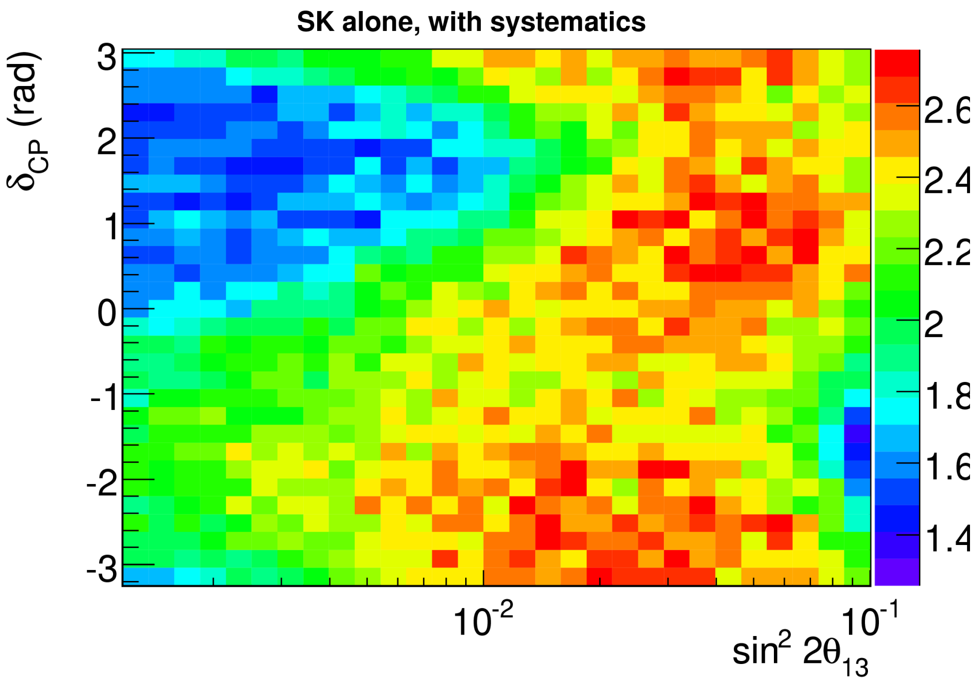
- Pick a point A on the map
- Make fake data from MC(A), setting all the nuisance parameter to 0
- Compute min χ^2(A,best fit ε) and min(χ^2) = χ^2(best fit X, best fit ε')
- Get $\Delta\chi^2$(A) =min χ^2(A,best fit ε) – min χ^2(best fit X, best fit ε') distribution

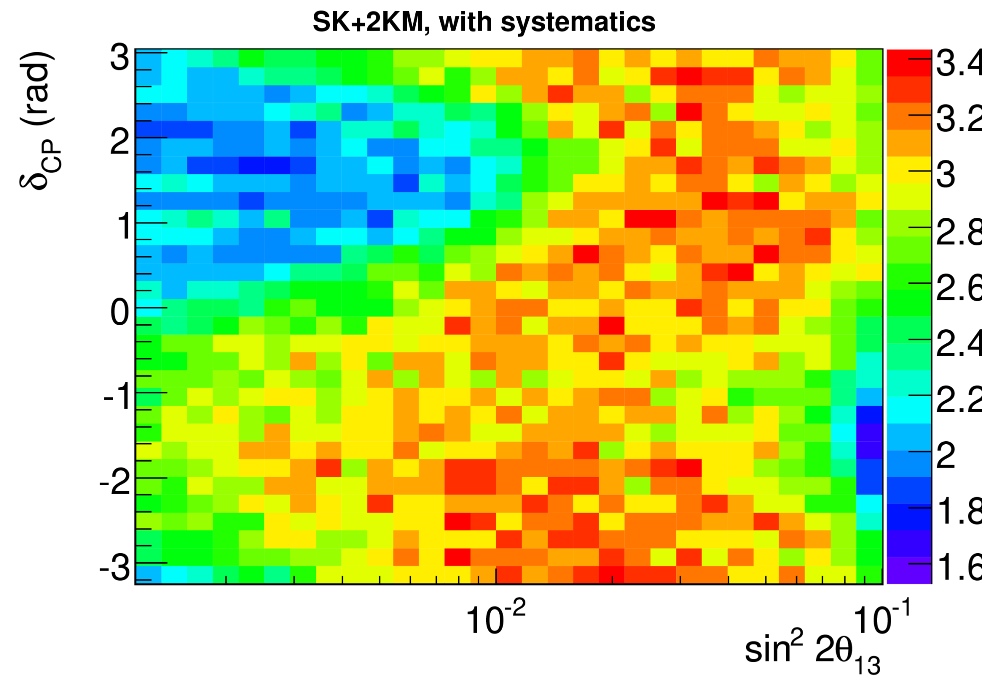
--> will depend on A (non linearities etc.)
- Determine α CL cut position on $\Delta\chi^2$(A) distribution --> critical value C_α(A)
- Use this cut on χ^2(data,A,best fit ε)- min(X,ε) χ^2(data), to decide if data accepts point A or not
- Repeat for all points on the map

Basically same procedure as before, but with a minimization of the nuisance parameters at each step.
This is an approximation, considered to be very good (Kendall& Stuart ?) and certainly much faster than making a full Neyman construction over many (nuisance) parameters.
Question : is it correct to fix the nuisance parameters to their "central value" 0 ? Does it change the coverage when they are set to some other value ? Should they be randomized when making fake data ?

F-C critical values : with syst

Nuisance parameters fixed at 0 when making fake data, always fitted during the computations as explained on slide 2.





At 90% CL.

- The critical values are clearly lower than in the absence of systematics
- This is not the expected behaviour : in the case of c² distributed estimators, we don't expect any difference
- Possible hint that we should randomize the pulls when making fake data

UNDER INVESTIGATION