Contribution ID: **79** Type: **ORAL**

Uncertainty budgeting for large scale components production and micron precision accelerators pre-alignment as required by CLIC project

A new strategy for uncertainty budgeting estimation following the International Standard (GUM - Supplement 1) is proposed as alternative to current classical methods of error budgeting applied in the domain of accelerator components. This strategy applies stochastic modelling on the uncertainty contributing factors for providing probability density function as quantification of global pre-alignment uncertainty. As a case study the methodology is applied to the PACMAN pre-alignment project providing a 'measurement specific' uncertainty budget for accelerator pre-alignment components according to GUM - Supplement 1. With this methodology the global uncertainty budget can be determined as function of the exact conditions of each specific contributing factor (temperature and its gradients, measurement strategy, instrumentation, etc.). We believe that this methodology would provide a more accurate approach on the tight uncertainty budgeting allocated for the alignment requirements of the future particle accelerators projects. The method could be easily extrapolated/applied for uncertainty budgeting of different type metrology systems.

Summary

A new strategy for uncertainty budgeting estimation following the International Standard (GUM - Supplement 1) is proposed as alternative to current classical methods of error budgeting applied in the domain of accelerator components. This strategy applies stochastic modelling on the uncertainty contributing factors for providing probability density function as quantification of global pre-alignment uncertainty. As a case study the methodology is applied to the PACMAN pre-alignment project providing a 'measurement specific' uncertainty budget for accelerator pre-alignment components according to GUM - Supplement 1. With this methodology the global uncertainty budget can be determined as function of the exact conditions of each specific contributing factor (temperature and its gradients, measurement strategy, instrumentation, etc.). We believe that this methodology would provide a more accurate approach on the tight uncertainty budgeting allocated for the alignment requirements of the future particle accelerators projects. The method could be easily extrapolated/applied for uncertainty budgeting of different type metrology systems.

Author: DOYTCHINOV, Iordan Petrov (CERN)

Presenter: DOYTCHINOV, Iordan Petrov (CERN)