

First meeting of the MIXMAX network on innovative pseudo- random number generators

EU project MIXMAX-H2020-MSCA-RISE02014

Held at CERN

3rd July 2015

- ❑ To develop a new generation of pseudo-random number generators based on Kolmogorov-Anosov K-systems.
- ❑ Funded through EU: MIXMAX-H2020-MSCA-RISE02014
- ❑ *Research and Innovation Staff Exchange (RISE) funds short-term exchanges for staff to develop careers combining scientific excellence with exposure to other countries and sectors.*
- ❑ *RISE enables more interaction between academia and non-academic organisations within Europe and worldwide.*
- ❑ *should include **at least three partners**, which can be universities, research institutions, or non-academic organisations*
- ❑ MIXMAX beneficiaries : CERN, NCSR “Demokritos”, Copenhagen University

Goals of the meeting

1. to discuss and to exchange new ideas for generation of random numbers, to test the quality of sequences and to explore possible areas of their application.
2. to learn the particular roles and interests of the various partners participating in the project
 - start with reports that summarise the current status of work in this area
 - finish with a roundtable discussion – can include:
 - review the project deliverables and key milestones
 - steps needed to ensure effective communication between partners
 - plans for using resources – working secondments
 - plans for the next meeting(s), workshop

- ❑ Long-term interest in RNG, going back to days of CERNLIB
- ❑ Use cases in event simulation, statistical analysis and theory
- ❑ SFT group manages the common software layers of the software stack used by the LHC experiments
- ❑ ROOT contains math libraries and statistical analysis tools
- ❑ *The new type of generators demonstrate excellent statistical properties and we aim to turn them into useful products for Monte Carlo simulations*
- ❑ Performance is crucial - need to exploit all levels of parallelism offered by modern CPU architectures
 - e.g. vectorisation, co-processors (GPU) and many-core
- ❑ *We aim to develop libraries and integrate them in the CERN software applications used by HEP experiments.*