

ROOT package in High Energy Physics tasks

1. Introduction:

ROOT is an object-oriented program and library designed for high computing efficiency, as it is required to process data from the Large Hadron Collider's experiments. As of 2009 ROOT is mainly used in data analysis and data acquisition in high energy physics experiments (STAR, ALICE, CBM, BM@N and others) and most current experimental plots and results in those subfields are obtained using ROOT.

2. Work overview:

The participant will learn general information about ROOT package. On the CBMROOT example, he will learn how the software for high-energy physics (HEP) experiments is work and which methods and algorithms are used for data analysis in HEP. He will try to use ROOT to solve the task of particle identification for the CBM experiment.

3. General work plan:

- 3.1 Learn about ROOT.
- 3.2 Install ROOT on computer.
- 3.3 Learn about CBMROOT.
- 3.4 Learn about method for particle identification on example of the CBM experiment.
- 3.5 Create software for particle identification based on different methods.
- 3.6 Present the results of his work as a presentation with histograms, tables and so on.

4. Requirements:

Basic skills in C++ and Linux

5. Materials:

- ROOT User's Guide, <https://root.cern.ch/guides/users-guide>
- C. Lippmann, Particle identification, Nucl.Instrum.Meth. A666 (2012) 148-172
- Akishina E. P., Akishina T. P., Derenovskaya O. Yu., Ivanov V. V., Methods of e/π identification with the Transition Radiation Detector in the CBM experiment, Bulletin of PFUR Series Mathematics.InformationSciences.Physics., №2 (2), 2010, pp. 76-84

6. Amount of participants:

1

7. Project manager from JINR:

Derenovskaya Olga, Ph.D. in Physics and Mathematics, senior researcher,
Scientific Department of the computational physics, Laboratory of Information technologies.
Interests: data analysis, statistical methods, high energy physics, CBM experement