

Тема **отзыв на проект**

От Alexey Guskov <Alexey.Guskov@cern.ch>

Кому titkova@jinr.ru <titkova@jinr.ru>, gostkin@jinr.ru <gostkin@jinr.ru>, bedny@jinr.ru <bedny@jinr.ru>

Дата 2023-03-27 12:02

---



Best regards.  
Alexey

**REFEREE REPORT**  
**on the project AMBER (NA66)**

The AMBER project can be considered as an essentially new stage of the COMPASS experiment. On the other hand, it not just a continuation of the old project but a new one with its own tasks and approaches to their solution.

The initial stage of the experiment's physical program includes three measurements. First, it is planned to study elastic muon-proton scattering and determine from it the charge proton radius with high precision. This will be a unique measurement, since earlier the radius was determined either from electron-proton scattering data or from hydrogen atom spectra. The new measurement is important to resolve the so-called proton radius puzzle. Second, it is planned to measure the cross sections of Drell-Yan and  $J/\Psi$  production processes in order to extract information about the pion and kaon parton distribution functions which are known now with a rather poor precision. This task is important for studies of hadron structure and moving forward in the solution of very basic problems of QCD. Third, the rates of anti-proton production will be measured for several collision channels. The results are again important for studies of hadron structure and for astrophysical applications. The latter include searches for signal of dark matter annihilation, which attract a lot of attention nowadays. So, the experimental program is quite impressive and promising.

The AMBER experiment is approved by CERN. The participation of the JINR group in the AMBER collaboration is crucial for the successful conduction of the experiment. The JINR group is responsible for upgrade and operation of the hadron calorimeter HCAL1 and the large-angle muon identification system MW1. It also participates in production of the Bulk Micromegas detectors. Certainly, the high qualification of the group will allow to substantially contribute to the analysis of forthcoming experimental data. Participation of the JINR group in the AMBER experiment will be important to strengthen international cooperation of JINR.

The project proposal contains a fairly complete description. It justifies the relevance and scientific novelty of the proposed studies. The time schedule and the financial request look realistic and reasonable. The JINR team consists of scientists and engineers of high qualification relevant for the successful conduction of the project.

I support this project and recommend to finance it with high priority.

Andrej B. Arbuzov  
Dr. Sci., prof. RAS  
head of sector in BLTP JINR  
e-mail: arbuzov@theor.jinr.ru



