

Referee's report on project:

Dark Matter NA64 (dark photons) experiment at the CERN SPS

The project under review forms part of the JINR neutrino and dark matter programme; under the theme: *Study of Rare Charged Kaon Decays and Search for Dark Sector in Experiments at the CERN SPS*, which also includes the NA62 fixed-target experiment conducted in the H4 beam line system of the CERN-SPS complex. The Na64 experiment is a fixed-target experiment at the CERN SPS combining the active beam dump and missing energy techniques to search for rare events. The experiment P348 was proposed to the CERN SPSC in January 2014 with the primary goal of searching for the dark photon (A') decay processes through the $A' \rightarrow \text{invisible}$ and $A' \rightarrow e^+e^-$ decay modes. This is a channel that has been proposed as a theoretical possibility for accessing the region in which there could be interactions between ordinary and dark matter.

In general the answers presented by the authors were pointed and focused, and the report has presented a very compelling scientific case and indicates the roles and responsibilities of the JINR group. However, it would have been helpful if a more detailed layout of contribution, in terms of time (or percentage of FTE commitment) to be spent by the JINR team to the experiment. This would have given a clearer indication of the manpower commitment that the JINR will make to the project. Furthermore, it would be most encouraging to see a plan put forward for potential student participation leading to PhD theses. It would also be encouraging to see the playing a leading role in making presentations at conferences.

The scientific merit of the project is very compelling as it seeks to address one of the most topical issues in physics and astronomy. Furthermore, the experiment has gone through the rigorous SPSC process and therefore all matters related to costs and scientific feasibility, one would assume, have been properly addressed. Furthermore, the JINR group is playing a pivotal role in the terms of scientific programme development and in taking responsibility for detector development. The JINR group has taken a main responsibility for the thin-wall drift tube tracking system, and the report has clearly articulated the excellent progress made by the team in the process leading to the installation and final preparation for the data taking process.

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