

## **Review of the proposal „JINR Participation in the NA64 Experiment at CERN”**

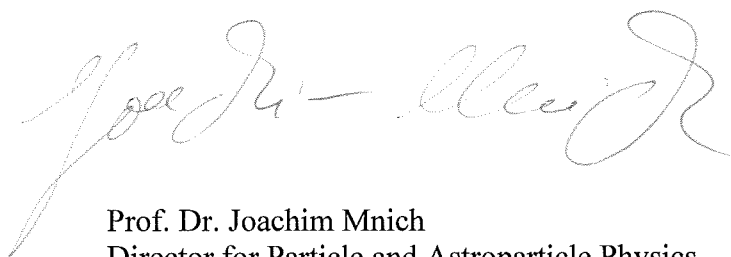
The NA64 experiment is a fixed-target experiment at the CERN SPS combining the active beam dump and missing energy techniques to search for rare events. The experiment consists of a fully hermetic detector with the primary goal to search for light dark bosons ( $Z'$ ) from dark sector that are coupled to photons, e.g. dark photons ( $A'$ ).

Particles like dark photons are considered to be potential candidates to make up for the Dark Matter in the universe. Although the particle nature of Dark Matter filling up the Universe can only be proven in other dedicated experiments, such particles beyond the Standard Model could be discovered with detectors at accelerators which would allow detailed studies of their properties. Hence, there is a clear and complementary scientific case for the search for new weakly interacting particles beyond the Standard Model at colliders like the LHC and in specialised experiments like NA64.

The NA64 experiment has been reviewed and approved by CERN and it is now fully supported by the laboratory. This clearly demonstrates the scientific potential and the technical soundness of the experiment. Also, there is a rather strong international collaboration behind the project. The proposed JINR contribution to NA64 is the delivery and operation of the tracking detector which is based on thin-wall drift-tubes, so-called straw tubes. Prototypes of these detectors have been produced and tested indicating the validity of the design. I have no doubts that JINR has the expertise and capability to successfully carry out this project in the time frame set. The required resources amount to 220 k\$ (plus manpower) in the next three years which is modest and adequate.

A point to be considered by the JINR management is the strategic importance of the project for the laboratory. There are already strong Russian groups in the NA64 collaboration and I believe that the ambition of JINR should be to play a leading role in the experiment providing essential and unique contributions, as well as serving as a hub for Russian groups in an experiment at CERN. From the proposal it is not obvious to me that the planned activities do have the right scope to meet such a goal. Also, it should be made sure that the participation in NA64 does not weaken other important JINR activities at CERN and the very ambitious programme in Dubna itself.

In summary, I consider NA64 a very interesting project with a very high scientific potential. From the purely scientific point of view I recommend the participation as of the laboratory. I further recommend that scope and focus of the JINR participation in the collaboration should be considered in light of the strategic goals of the laboratory.



Prof. Dr. Joachim Mnich  
Director for Particle and Astroparticle Physics  
DESY, Germany