The project „Simulation studies and tests of the scintillation light detection and trigger systems of the ICARUS T600 detector" is important and innovative in many ways. Going bottom-up, one has to say that both systems are equipped with very advanced, fast and programmable electronics, which makes the work on the project very interesting. Part of the project tests will be performed at the dedicated test facility at the Neutrino Platform at CERN, which offers exceptional possibilities for experimental work in particle physics.

The ICARUS T600 detector, up to now the largest Liquid Argon Time Projection Chamber (LAr-TPC) used in particle physics experiment, has been the pioneer in using this detection technique, which is rapidly gaining ground in studies of neutrino interactions and oscillations. The attractiveness of LAr-TPCs is related to the fact that they offer very precise spatial and energy measurements, based on the electron signal from the Argon ionisation, as well as very good time measurements, based on very fast scintillation light signals from the Argon de-excitation. It is popular to say that the LAr-TPCs are like fully electronic bubble chambers – the instrument with a beautiful history in particle physics and honoured with the Nobel Prize in physics.

The ICARUS T600 detector with be used in the Short Baseline Neutrino experiment at the Fermi National Laboratory (FNAL) near Chicago in US. FNAL is the largest American laboratory in particle physics, specialised in neutrino studies with accelerator neutrino beams. The detector will operate at shallow depths, facing very challenging experimental conditions because of being exposed to the huge cosmic rays background, which can mimic genuine neutrino interactions. Therefore, it will be fundamental to distinguish the signals related to the neutrino beam from those of induced by cosmic rays. The efficient trigger based on the scintillation light signals will be essential for this purpose.

The SBN experiment inscribes in an extensive experimental programme of searches for sterile neutrino (neutrinos), whose existence is one of the fundamental open questions of neutrino physics. The last twenty years brought several breakthroughs in neutrino physics, like the discovery of neutrino oscillations or the beginning of neutrino astronomy, and nowadays it represents one of the most active fields of research. The discovery of sterile neutrinos would open a rich field of experimental and theoretical studies of their properties, their mixing with the Standard Model neutrinos and their role in particle physics, astrophysics and cosmology.