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Recent results from n_TOF

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Based on an idea by Carlo Rubbia, the n_TOF facility at CERN has been operating during the last 20 years. it is a neutron spallation source, driven by the 20 GeV/c proton beam from the CERN PS accelerator. Neutrons in a very wide energy range (from GeV, down to sub-eV kinetic energy) are generated by a massive Lead spallation target feeding two experimental areas set at 185 meters (EAR1, horizonal with respect to the proton beam direction) and at 20 meters (EAR2, vertical) from the spallation source. Neutron energies for experiments are selected by the time-of-flight technique, (hence the name n_TOF), while the long flight paths ensure the possibility of doing very high-resolution measurements.

Over the course of two decades, over one hundred experiments have been performed by the n_TOF Collaboration, with applications ranging from nuclear astrophysics (synthesis of the heavy elements in stars, big bang nucleosynthesis, nuclear cosmo-chronology), to advanced nuclear technologies (nuclear data for applications, nuclear safety) to basic nuclear science (structure and decay of highly excited compound states).

During the planned shutdown of the CERN accelerator complex between 2019 and 2021, the facility went through a substantial upgrade with a new target-moderator assembly, refurbishing of the neutron beam lines and experimental areas. An additional measuring and irradiation station (the NEAR Station) has been envisaged and its capabilities for performing material test studies and new physics opportunities are presently explored.

An overview of the facility and of its experimental plan for future activities will be presented, with a particular emphasis on the most recent results and planning for the future.

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