High precision neutron-induced cross-section measurements are of major importance for a wide variety of research fields in fundamental and applied nuclear physics. One of most interesting research area of nuclear astrophysics is stellar nucleosynthesis. Study with high precision of the nuclear reaction induced by neutrons in stars and stellar environment allows to understand evolution of the chemical elements in the Universe. On the other hand, in the field of nuclear technology, a renewed interest in nuclear energy production has triggered new studies aimed at developing future generation systems that would address major safety, proliferation and waste concerns.

We plan to perform the measurement of a cross section for following important reactions for astrophysics and development of nuclear technology for neutrons energy up to about several hundred keV. We are going to perform studies for the following nuclear reactions induced by neutrons: ^{26}Al(n,α), ^{26}Al(n,p), ^{77,78}Se(n,γ), ^{68}Zn(n,γ), ^{50,53}Cr(n,γ) and ^{239}Pu(n,γ). The obtaining probability of mentioned reaction induced by neutrons on isotope ^{26}Al and a radiative neutron capture measurement for isotopes of selenium and zinc will allow to reduce uncertainty in determination of the abundance of elements in the mid-mass region in the Universe. The next task of the project is to study of the nuclear reaction ^{239}Pu(n,γ) and ^{50,53}Cr(n,γ). Whereas the results of this study are very important for the design a new type of nuclear reactors.

These measurements are planned to be procced at CERN, with using neutron spallation source with unique parameters on the global scale. The scientific measurement program of the n_TOF International Collaboration was started in 2001. During first period, the one experimental station (EAR1) located at 185 m from the neutron production target was available. Construction of a second beam line at 20 m (EAR2) in 2014 has substantially increased the measurement capabilities of this neutron facility.

The one of important task of the project is determination of the cross section for ^{26}Al(n,α) and ^{26}Al(n,p) reactions in the range of energy corresponding to stellar temperatures. To this purpose, we are going to use the telescope of charged particles made of silicon detectors with dedicated electronics prepared at the University of Lodz. Another ambitious goal is the determination of cross section for the ^{239}Pu(n,γ) reaction, due to the fission reaction is dominant in interaction of neutrons with this isotope. The emission of gamma photons from excited fission fragments causes a large gamma background, which in the electromagnetic radiation detector can be eliminated by signals from the fission fragments. We will use the multi section ionization chamber which will be also constructed at the University of Lodz to register fission fragments.