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Laboratory: FLNR, sektor 6, ACCULINNA

Topical plan for JINR research and international cooperation, Nuclear Physics (03), Theme (03-5-1130-2017/2021):

Synthesis and Properties of Nuclei at the Stability Limits.

Project: Introduction to  $\beta$ -delayed particle spectroscopy by the OTPC (Optical Time Projection Chamber) technique. Project is addressed to max 2 students.

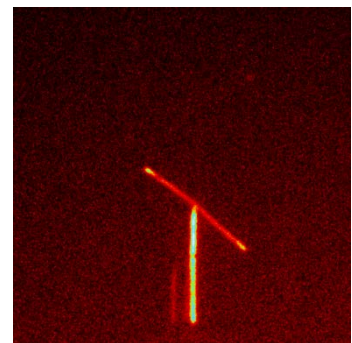
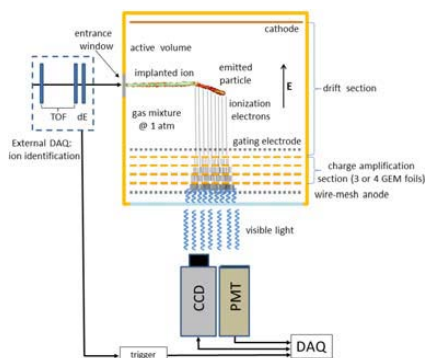
### Project description:

1. Getting familiar principle of operation of the in-flight separator. Getting familiar with design and operation principle of the ACCULINNA and ACCULINNA-2 separator and with detectors and detection techniques in experiments at ACCULINNA.
2. Getting familiar with charged particle detection technique applied to the OTPC (Optical Time Projection Chamber) and the 'mini OTPC' detector system for studies of light emission from gas mixtures used in the OTPC.
3. Analysis of the experimental data.

The main goal of the practice is to get familiar with novel technique of charged particle detection – the setup of the OTPC spectrometer. In the period of summer training students will get introduction to the main studies at the Flerov Laboratory of Nuclear Reactions and to the main area of studies at the ACCULINNA separator, with principle of operation of the separator. The new ACCULINNA-2 separator will be introduced. Students will get basic knowledge about novel technique of charged particle detection and principle of operation of the OTPC spectrometer.

Moreover, they will work with a 'mini OTPC' detector system designed for studies of the light emission from gas mixtures used in the OTPC spectrometer. Operation with gas system of the mini OTPC is planned. The main task will be analysis of the experimental data –  $\beta$  delayed particle emission in a decay of  $^{27}\text{S}$ .

Additionally during the summer training a series of excursions to the main experimental facilities at FLNR will be organized (microtron MT-25, cyclotron IC-100 and U400M).



(Left) The scheme of the OTPC operation. (Center) The OTPC installed on the beam (right) example of  $\beta$ -delayed 2-proton emission.

### Requirements:

The projects is related to students and PhD students interested in nuclear physics, experimental physics and particle detection techniques. Basics knowledge in nuclear physics.

Useful links:

<http://fls2.jinr.ru/flnr/index.html>

<http://aculina.jinr.ru/>

<http://lise.nslc.msu.edu/lise.html>

<http://indico.cern.ch/event/3062/contribution/135/material/poster/0.pdf>

[http://www.fuw.edu.pl/~pfitzner/Research/2pDecay/Talks/MPF\\_ISOLDE\\_L1.pdf](http://www.fuw.edu.pl/~pfitzner/Research/2pDecay/Talks/MPF_ISOLDE_L1.pdf)