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**Laboratory:** FLNR, sektor 6, ACCULINNA

**Topical plan for JINR research and international cooperation, Nuclear Physics (03),**

**Theme (03-5-1094-2010/2016):** Synthesis and Properties of Nuclei at the Stability Limits.

**Project: Introduction to the novel technique of charged particles detection - OTPC (Optical Time Projection Chamber)**

Project is addressed to 2 students.

Project description:

1. Getting familiar with research program at the ACCULINNA separator.
2. Getting familiar with detectors and reaction products detection techniques in experiments at the ACCULINNA separator; silicon detectors (Si), scintillators (CsI(Ta), stilbene crystals).
3. Getting familiar with charged particle detection technique applied in the OTPC (Optical Time Projection Chamber) and the 'mini OTPC' detector system for studies of light emission from gas mixtures used in the OTPC.
4. Analysis of experimental data.

The main goal of the practice is to get familiar novel technique of charged particle detection - the setup of the OTPC spectrometer. During the summer training students 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 project of 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 and about 'mini OTPC' detector system and 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 of in a decay of  $^{27}\text{S}$ .

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

Requirements:

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

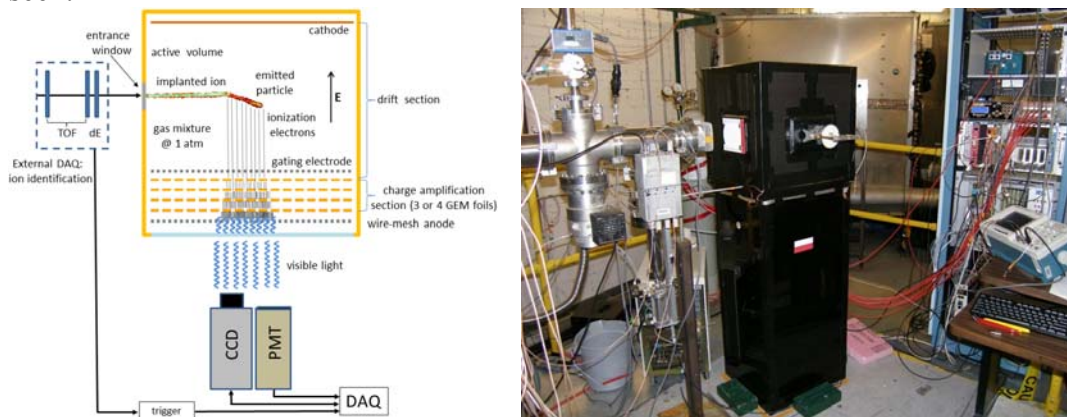


Fig. 1 (Left) The scheme of the OTPC operation (Right) The OTPC installed on the beam.

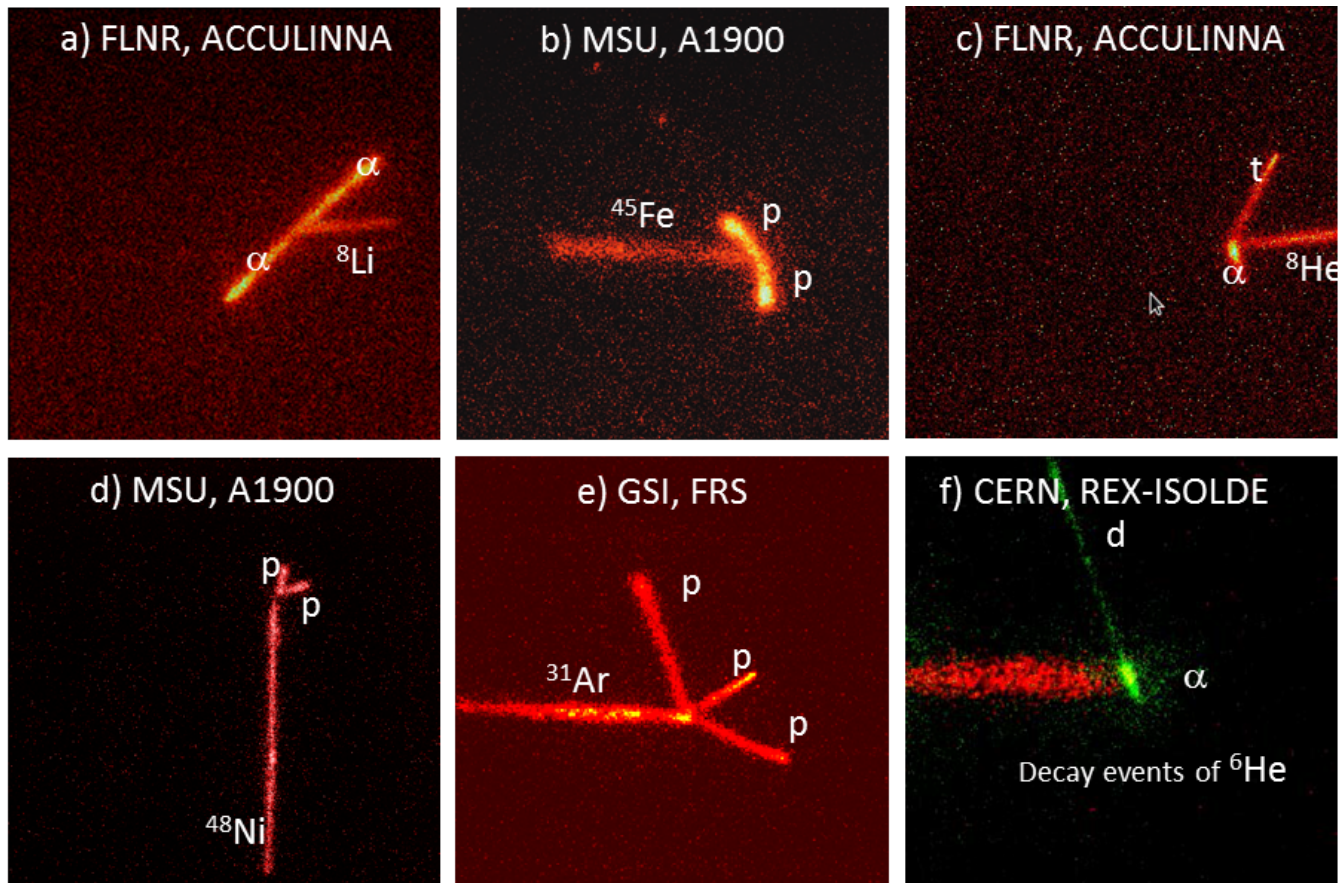


Fig 2. Example events recorded by the OTPC (all data are published - if you are interested in detail, please ask for the references by email).

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