Prague, Czech Republic June 21-25, 2021

Contribution ID: **200** Type: **Poster**

#10-200 Remotely controlled laboratory gamma-ray spectrometry with CdZnTe-detectors

Thursday, June 24, 2021 4:40 PM (5 minutes)

Now, when the entire educational process had to be transferred to distance learning, we faced difficulties in performing laboratory and practical exercises, which require real laboratory equipment.
One option is virtual labs using a variety of distance learning platforms. In the 2020-2021 academic year at the Odessa National Polytechnic University to study the courses “Experimental Methods of Nuclear Physics” and “Spectrometry of Ionizing Radiation”, a project of a virtual educational laboratory of gamma spectrometry with remote laboratory experiment is being implemented. A remote experiment is a real experiment with real laboratory instruments and equipment that can be controlled by a teacher or a student from their computer through the Internet.
The special laboratory kit is based on μSPEC microspectrometers (ZRF Ritec SIA). Also, we use the spectrometers based on SDP500 (Ritec) CdZnTe-detectors connected to the multichannel analyzer MCA-166 (GBS-Elektronik GmbH). A LattePanda single-board computer is used to control the operation of spectrometers, collect, and analyze data. LattePanda - A Windows 10 Computer with integrated Arduino. This explains the choice of LattePanda. Windows 10 application allows you to use the WinSPEC software to control the multichannel analyzer operation supplied with the spectrometer. The built-in Arduino allows you to remote control the movement of the radiation source during laboratory experiments. A VNC server is used to implement remote control and access to a Windows GUI running on LattePanda. The vendor recommends TightVNC, a free and easy way to set up this service.
Laboratory exercises for students include both the traditional tasks of calibration of the spectrometer (energy calibration and efficiency curves), including those for various source geometries, processing the measured spectra using standard programs, calculating the activity of sources, and creating a spectra processing program and a spectrometer MCA-166 control program. Samples containing natural radionuclides and sources of low activity, which do not require a special permit, are used as sources.

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Session Classification: 10 Education, Training and Outreach

Track Classification: 10 Education, Training and Outreach