

Детекторная школа CREMLIN+ (Task 7.4): Статус и планы

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ИЯФ СО РАН

Organizational plan

- ✓ Hold first LOC and IOC meetings and make them regular
- ✓ Gather ideas for the school
- ✓ Compile preliminary list of lectures and hands-on experiments
- ✓ Define max number of participants: about 50
- ✓ Determine the scope and format: Ion/nuclear physics, Particle physics, Neutron physics; lectures and elective hands-on exercises
- ✓ Define the date and duration: **July 4-15, 2022 (12 days)**
- Set up website and/or Indico
- Find lecturers
- Announce and advertise
- Organize student admission and selection
- Prepare the hands-on experiments
- Hold the school

Веб-ресурсы

- Wiki-page for organizers:
https://ctd.inp.nsk.su/wiki/index.php/Detector_school_CREMLINplus
- Indico page:
<https://indico.inp.nsk.su/event/41/>
- Planning spreadsheet:
https://docs.google.com/spreadsheets/d/1GhG-1pajMyffXE6BPpqz_VzSh1T-qbjMA-s3MtKKdol/edit?usp=sharing
 - Hands-on exercises
 - Lectures
 - Social events

Список практических занятий



CREMLINplus Detector School planning ☆ 📄 ☁

Файл Правка Вид Вставка Формат Данные Инструменты Дополнения Справка Последнее изменение: Сергей Анатольевич Ко...



Настройки Достапа



#	Contributing institution	Instructors, support personnel	Course title	Exercise concise description	Requirements to entering students	Equipment provided by contributing institution	Equipment to be provided or purchased by BINP	Preparation works
1	BINP	Mikhail Bamyakov, Sergey Kononov	Semiconductor spectrometer detectors	1. Alphas in Si detector. Measurement of detector capacitance and depletion zone thickness. Energy resolution measurement. 2. Gammas in HPGe detector. Energy resolution determination. Estimation of energy per electron-hole pair.	Basic knowledge of particle interaction with matter	1. Si surface barrier detector, vacuum volume setup, vacuum pump, alpha source Pu-239, set of CAMAC electronics, PC with Linux and application SW 2. Ortec HPGe detector, vacuum pump, mechanical cooler (X-Cooler), analyzer, PC with Windows (XP, 7, 10) and Maestro SW	None	1. Electronics & software upgrade Assembly & testing, English instructions 2. English instructions
2	BINP	Mikhail Bamyakov, Sergey Kononov	Scintillation spectrometer detectors	Detection of gammas in NaI, LSO, BGO, plastic. Understanding principle. Spectra acquisition. Energy calibration. Measurement of energy per photoelectron. Energy resolution estimation.	Basic knowledge of particle interaction with matter	PMT, pre-amplifier, set of scintillators, set of CAMAC electronics, Cs-137 gamma-source, PC with Linux and application SW	None	Electronics upgrade. Software upgrade. English instructions.
3	BINP	Sergey Kononov	X-ray experiment	X-ray absorption, Bragg's law, Moseley's law, characteristic X-rays, X-ray imaging, computing tomography, etc (to be selected)	Basic knowledge of X-ray interaction with matter	PHYWE XR 4.0 expert unit (35 kV) and accessories, PC with Windows and 'measure' SW	None	Defining sets of exercises and testing them.
4	BINP	Andrey Sokolov, Shakirova Tamara (?)	Time projection chamber	Simulation of tracks from alpha-particles using SRIM simulation package; Study of basics principles of operation of TPC; Recording of tracks from alpha-source; Data processing, estimation of the spatial and energy resolution of the TPC.	Basic knowledge of particle interaction with matter.	TPC model, HV supply, gas flow setup, PC with OS and application SW	None	Developing exercises and English instructions
5	NSU	Evgeniy Kravchenko	Large area scintillation counters for TAIGA experiment	1. Measurement of the multiplication coefficient of the PMT. 2. Measurement of the PMT linearity. 3. Assembling of the scintillation counter. Measurement of the amplitude distribution within a counter. 4. Measurement of the spectrum of Extensive Air Showers.	Basic knowledge of particle interaction with matter. Basic knowledge about astroparticle physics, namely the creation of cosmic muons.	In-house made large area scintillation counters, HV supply, oscilloscope, analyser, PC with Linux	HV supply like DT1470ET (4ch up to 8kV, 3 mA) or DT8033 (8ch up to 6kV, 3 mA)	Developing exercises and English instructions
6	Giessen	Avetik Harapetyan	Single photon detectors	Acquiring dark and laser signals of SiPMs and PMTs with an oscilloscope	Basic knowledge about particle sensors	MCP-PMT and/or SiPMs Scintillator material	Oscilloscope, HV power supplies up to 3000 V, Low voltage supplies up to 50 V, Blue pulsed laser with single-photon-mode or attenuator, Dark box or possibility to darken the room completely	Testing sensors in Giessen Designing exercises and English instructions
7	Giessen	Avetik Harapetyan	COSMO boxes	1. Measuring the time-of-flight (TOF) of cosmic muons 2. Determining the life-time of muons 3. Validating the angular dependency of the muon rate	Basic knowledge about astroparticle physics, namely the creation of cosmic muons	Cosmo boxes	None	Shipping
8	Giessen	Mustafa Schmidt	Detector simulations with GEANT4	1. Simulating Cherenkov light in fused silica 2. Inserting optical parameters for simulations of scintillation and Cherenkov light	Basic knowledge about particle interaction with matter, scintillation light, and Cherenkov radiation	Software framework	PCs with Ubuntu Linux, Geant 4	Developing exercise class and instructions

Hands-on exercises Lectures Social events

Анализ данных

Список тем лекций

1. BINP HEP facilities
2. Tracking
3. Calorimetry
4. Silicon detectors
5. Neutron detection
6. Particle identification
7. Photodetectors
8. Gaseous detectors
9. Trigger and Data Acquisition
10. ASIC design
11. FPGA programming
12. Test beam analysis
13. Long-term history of TPC development (Franco Grancagnolo)

Список мероприятий

1. Welcome party (Reception) - July 4, 2-3 hours
2. Conference dinner - July 6, 3 hours
3. Trip along the Ob river - 1 weekend day
4. ...

Текущие расходы

- 2 набора FPGA для практической работы Introduction to FPGA. (Л. Эпштейн), 341 тыс. руб. = 3810 Евро
- Настольный высоковольтный ИП (Е. Кравченко), 6900 Евро = 621 тыс. руб.
- Комплектующие для апгрейда прототипа ТРС (А.Соколов), ??? руб.
- Компьютерный класс на 15 мест – 1 млн руб.?