

Status of the ARIEL Education and Training

May 2021

H. Penttilä, ARIEL training coordinator

PAC_1 Education and Training / Scientific Visits status

PAC 1	Visitor	Institute	Contact	Requested weeks	Approved weeks	Total cost	Status
SV_1_1	Miguel Astrain Etxezarreta	HZDR	Andreas Wagner	25	25	6300	Completed, report received
SV_1_2	Ana Maria Gomez	JRC-Geel	Stephan Oberstedt	12	12	13000	September-October 2021 visit scheduled
SV_1_3	Diego Tarrío	JRC-Geel	Stephan Oberstedt	4	4	5000	Visit scheduled exact date not specified
SV_1_4	Ali Al-Adili	JRC-Geel	Stephan Oberstedt	4	4	5000	Visit scheduled exact date not specified
SV_1_5	Jukka Jaatinen	JGU Mainz	Klaus Eberhardt	2	2	2500	Postponed due to COVID 19. Not rescheduled.
SV_1_6	Juan Peñas	HZDR	Arnd Junghans	4	4	4800	Restart activity as quickly as possible this year. Date not yet scheduled

PAC_2 Education and Training / Scientific Visits status

PAC 2	Visitor	Institute	Contact	Requested weeks	Approved weeks	Total cost	Status
SV_2_1	Nicolae Carjan	JRC Geel	Stephan Oberstedt	12	6	6700	Postponed due to COVID 19; presence on the JRC site is currently restricted
SV_2_2	Andrea Oprea	JRC-Geel	Peter Schillebeeckx	12	8	8800	Visit planned this year, not scheduled. (Presence on the JRC site is currently restricted)
SV_2_3	Ahmed Shama	JRC-Geel	Peter Schillebeeckx	12	6	6700	Permanently cancelled
SV_2_4	David Knezevic	MTA, Budapest	László Szentmiklósi	3	3	3550	preliminary work started remotely. Tentative date early fall 2021
SV_2_5	Quentin Ducasse	PTB, Braunschweig	Elisa Pirovano	3	3	3550	Completed, report received
SV_2_6	Riccardo Mucciola	JRC Geel	Peter Schillebeeckx	12	9	9850	Preliminary work done, sample is ready. No defined date for visit yet
SV_2_7	Eckart Grosse	IPN Orsay	Jon Wilson	4	4	5000	Postponed due to COVID 19. Not rescheduled.
SV_2_8	María Ángeles Millán Callado	HZDR	Arnd Junghans	12	11	11950	First 4 week visit ongoing (Second visit depending on

Miguel Astrain: OPEN-CL framework for Digitizer FPGA signal processing.

Dates: March 1 – August 31, 2020

Table 1. Detailed work plan.

1.2	Overview	Final Fulfillment
1.2.1	Analyze the current status	100%
1.2.2	Installation of all necessary programs	100%
1.2.3	Literature research on digitizer and FPGA	100%
1.2.4	Deciding whether Open-CL or HLS	100%
1.2.5	Work environment prepared	100%
1.3	Manipulation	
1.3.1	Translate Householder C++	100%
1.3.2	Development of the new algorithm for the FPGA	100%
1.3.3	Integration of the solution with the existing DAQ workload	75%
1.3.4	First runnable firmware	50%
1.4	Implementation	
1.4.1	Interface between FPGA and CPU	75%
1.4.2	Implementation of the new time stamp readout	100%
1.4.3	First timestamp at CPU	100%
1.5	Adaptation	
1.5.1	Update PALS-Software	75%
1.5.2	Compare old and new Timestamp	100%
1.5.3	Record a lifetime spectra	100%
1.5.4	First Lifetime Spectra	100%
1.5.5	Check and evaluate data	100%
1.6	Report	
1.6.1	Rough summary of the implementation steps	100%
1.6.2	Test report comparison old and new	100%
1.6.3	Outlook for further improvements	100%

Quentin Ducasse: MC simulations of a recoil proton telescope

Dates: July 13 – 24, 2020

- A systematic comparison of MCNPX and Geant4 for modelling a recoil proton telescope (RPT). The RPT was used for the measurement of the $^{235}\text{U}(n,f)$ cross section relative to differential n-p scattering cross section carried out at CERN n_TOF.
- Investigation of any systematic effect caused by the choice of the simulation code and the calculation of the associated systematic uncertainty.
- Establish competence at PTB in the use of Geant4 for such simulations

The following results were obtained:

- The angular distribution of the proton yield calculated with MCNPX deviates from that calculated using the VL cross sections. One reason is the use of non-relativistic kinematics in MCNPX but this is not sufficient to explain the details of the deviations.
- Fortunately, at the proton emission angle of 25° used for the RPT, the ratio of recoil proton yields calculated with MCNPX and VL40 is 0.990 ± 0.005 , i.e. the correction factor to be applied to the MCNPX simulations is very close to unity.
- The ratio of RPT efficiencies calculated with MCNPX and Geant4 is 1.00 ± 0.01 .

