NuPNET: NEDENSAA (NEutron DEtector developments for Nuclear Structure, Astrophysics and Applications)

J.J. Valiente Dobón (LNL-INFN)

Objective of the project

•Eight countries (Bulgaria, Finland, France, Germany, Italy, Spain, Sweden, Turkey) + Hungary

•**The present project is an effort to pool available resources and on going R&D by various groups throughout Europe with the aim of providing significant improvements in neutron detection.** The project is divided in different work packages that cover the various technologies and methods relevant for the improvement of the detection of neutrons. These range from the chemistry for development of **new scintillator materials**, **testing of the new materials** as well as the comparison with existing ones, the **study of innovative concepts for neutron detection**, **scintillator readout with SiPM**, **digital electronics** as well as the study of the **optimal geometry of the neutron detectors with other detector arrays** (such as Ge arrays). In addition, efforts will be made explicitly towards **networking and training** so that the expertise and technological advances made within the project will be available to all and will reach **beyond the lifetime of the project**.

Partners of NuPNET

- Italy   INFN
- France   CNRS/IN2P3
- France   CEA/DRT/LIST/DCSI/LCAE (associate)
- Finland   University of Jyväskylä
- Spain   CIEMAT
- Spain   IFIC
- Germany   TU Dresden
- Bulgaria   INRNE
- Turkey   TÜBITAK (associate)
- Sweden   Uppsala University (associate)
- Hungary   ATOMKI (new partner)

Working Packages

WP	Title	Partner No.	Country	Name
WP1	Development of new materials	No. 1	Italy	A. Quaranta
	Responsible: L. Stuttgé	No. 2	France	L. Stuttgé
		No. 3	France	M. Hamel
WP2	Characterisation of scintillator materials for neutron detection	No. 2	France	F. Delaunay
	Responsible: H. Penttilä	No. 4	Finland	H. Penttilä
		No. 5	Spain	D. Cano-Ott
		No. 6	Germany	T.E. Cowan
		No. 8	Spain	A. Algora
WP3	Innovative detector concepts	No. 5	Spain	D. Cano-Ott
	Responsible: D. Cano-Ott	No. 8	Spain	A. Algora
WP4	Photosensors	No. 1	Italy	J.J. Valiente-Dobon
	Responsible: T.E. Cowan	No. 6	Germany	T.E. Cowan
		No. 10	Sweden	J. Nyberg
WP5	Processing Technologies	No. 1	Italy	A. Triossi
	Responsible: D. Tonev	No. 2	France	F. Delaunay
		No. 5	Spain	D. Cano-Ott
		No. 7	Bulgaria	D. Tonev
		No. 8	Spain	A. Algora
		No. 9	Turkey	N.M. Erduran
		No. 10	Sweden	J. Nyberg
WP6	Optimal design of neutron detectors and gamma-ray detectors	No. 1	Italy	J.J.Valiente-Dobon
	Responsible: A. Algora	No. 5	Spain	D. Cano-Ott
		No. 8	Spain	A. Algora
		No. 9	Turkey	N.M. Erduran
WP7	Training and Networking	No. 1	Italy	A. Quaranta
	Repsonsible: A. Quaranta	No. 2	France	L. Stuttgé
		No. 3	France	M. Hamel
		No. 4	Finland	H. Penttila
		No. 5	Spain	D. Cano-Ott
		No. 6	Germany	T.E. Cowan
		No. 7	Bulgaria	D. Tonev
		No. 8	Spain	A. Algora
		No. 9	Turkey	N.M. Erduran
		No. 10	Sweden	J. Nyberg

Total of seven WP where the different groups/countries have join the common interests

Milestones

WP1
WP2
WP3
WP4
WP5
WP6
WP7

No of Milestone	Delivery month	Title
1	12	Synthesis of new solid components, transparent and discriminate neutrons from g with a good efficiency.
2	24	Beam tests in order to quantitatively characterize the new components.
3	36	Development of a prototype.
4	1	A draft test plan among the different partners.
5	6	Identifying the best available facilities for the tests.
6	12	Accurate Monte Carlo simulations of different materials.
7	Every 12 months	Experimental characterization of the scintillation materials.
8	18	Report on the design concepts of low and intermediate energy neutron detectors based on inorganic and organic scintillators.
9	30	Irradiation of the most promising candidates with known neutron fields: ^{252}Cf source, D/D and/or D/T neutron generator.
10	36	Report on the results of the irradiation of the detector prototypes and comparison to the Monte Carlo simulations.
11	12	Estimate for the factor in increased areal coverage that can be obtained by light concentrator schemes when using SiPM.
12	18	Working SiPM-scintillator coupled array and report.
13	24	Improved SiPM by KETEK package/chip.
14	36	Two representative setups composed of scintillator, light concentrator, and SiPM shall be tested in-beam as to the efficiency and time resolution.
15	18	Report on the digitizing frequency and number of bits of the FADC to do efficiently neutron/gamma discrimination.
16	36	Report on the synchronization of neutron detectors with other detectors for trigger purposes: GTS.
17	12	Implementation of the geometries of the different detector units (prototypes).
18	16	Development of the flexible simulation framework. Development of new and further development of existing event generators.
19	24	Development of analysis packages for the evaluation of the MC results.
21	36	Report and publication of the results.
22	every 12 months	Organization of meetings for the spreading and the discussion of the results and status of the various WP

Since the funding in each country has different timings the milestones might have slight shifts in time.

NuPNET

ERA-NET for Nuclear Physics Infrastructures

Dear Professor Valiente,

Thank you again for submitting a proposal in response to the first NuPNET Common Call for transnational activities. A total of 16 proposals were submitted to this transnational call involving more than 300 researchers. The total funding requested by these proposals amounts to € 8.76 million.

We are pleased to inform you that as a result of the evaluation process, the proposal NEDENSAA has been proposed for funding.

All NuPNET proposals were anonymously judged by two evaluators. Then, a Peer Review Panel composed of internationally renowned experts proposed a ranking of the received proposals and funding suggestions. Below you will find comments on your proposal made by the evaluators and by the NuPNET Peer Review Panel as well as an indication of the allocated funding.

Please keep in mind that each partner of your proposal will be funded by his funding agency and the final approval and exact funding will be announced officially by the respective funding agencies. Moreover, each funding agency will follow different procedures for the final allocation of the funding. Therefore, each NEDENSAA partner is expected to request from the NuPNET contact person at his funding agency information on the particular procedure for funding allocation.

Please distribute this information to all the partners of your NEDENSAA consortium.

Yours sincerely,

José Benlliure, on behalf of the NuPNET Common Call Secretariat.

Approval in August 2011

Duration: 36 months
Start: 01/11/2011 End: 01/11/2014
Total funding: 575.800 euro

Kick-off meeting 15th-17th
February – Madrid.

Kick-off meeting in Madrid

- A practical organization of the work by workpackage and evaluation on the synergies was thoroughly discussed.
- Hungary requested formally to be part of the project → Achived
- The collaboration decided to have a NEDENSAA webpage
  - *http://www.lnl.infn.it/~nedensaa/nedensaa_docserv.html*
  - Password protected area (to be requested) only for members of the collaboration
- A general porpouse committee "Steering Committee" was created in order to deal with the various issues that might be of interest to the collaboration and for a better knowledge spread.
- following meetings it will be discussed whether to have an ad hoc NEDENSAA school
- Third and last meeting will be in Istanbul before the ending of the project (september 2014) → To be decided the date in this meeting

Second collaboration meeting

NEDENSAA NuPNET Collaboration Meeting 2013

20-22 February 2013 *San Biagio Resort (www.sanbiagioresort.com)*
Europe/Zurich timezone

Search

Overview

Timetable

Registration

 Registration Form

List of registrants

Travel information

Info about Acireale

Hotel Reservation

The NEDENSAA NuPNET project is an effort to pool available resources and on going R&D by various groups throughout Europe with the aim of providing significant improvements in neutron detection. The project is divided in different work packages that cover the various technologies and methods relevant for the improvement of the detection of neutrons. These range from the chemistry for development of new scintillator materials, testing of the new materials as well as the comparison with existing ones, the study of innovative concepts for neutron detection, scintillator readout with SiPM, digital electronics as well as the study of the optimal geometry of the neutron detectors with other detector arrays (such as Ge arrays). In addition, efforts will be made explicitly towards networking and training so that the expertise and technological advances made within the project will be available to all and will reach beyond the lifetime of the project. This is the second meeting of the full NEDENSAA collaboration after the kick-off meeting at Madrid the 15th-17th of february 2012 (http://win.ciemat.es/inweb/NEDENSAA_meeting). In this second meeting the progress of the full project (different working packages) will be review.

Participating institutions (in a.o.): ATOMKI (Hungary), CEA (France), CIEMAT (Spain), CNRS/IN2P3 (France), IFIC (Spain), INFN (Italy), Institute for Nuclear Research and Nuclear Energy (Bulgaria), The Scientific and Technological Research Council of Turkey, Technical University Dresden (Germany), University of Jyvaskyla (Finland), University of Uppsala (Sweden).

Program

Wednesday 20th of February

Time	Open sessions
9,15-9,40	Welcome by INFN director of Catania (A. Pagano/G. Cuttone)
9,40-9,50	Practical information (G. Verde)
9,50-10,10	NEDENSAA project (J.J. Valiente-Dobon)
10,10-10,30	WP1-Status and perspectives (L.Stuttge)
10,30-10,50	WP2-Status and perspectives (H. Penttila)
10,50-11,20	Coffe break
11,20-11,40	WP3-Status and perspectives (T. Martinez)
11,40-12,10	WP4-Status and perspectives (D. Bemmerer)
12,10-12,30	WP5-Status and perspectives (D. Tonev)
12,30-12,50	WP6-Status and perspectives (A. Algora)
12,50-14,30	Lunch
14,30-15,10	Scionix (P. Schotanus)
15,10-15,50	STMicroelectronics (G. Fallica)
15,50-16,10	NEULAND (D. Bemmerer)
16,10-16,30	Neutron detection using MEDEA BaF2 array (C. Maiolino)
16,30-18,30	Visit of Acireale

Thursday 21st of February

Time	Open sessions
9,15-9,50	WP7-Status and perspectives (A. Quaranta) + HYDE project (A. Quaranta)
9,50-10,10	LUNA-MV (A. Guglielmetti)
10,10-10,30	FARCOS (G. Verde??)
10,30-10,50	n-TOF (M. Barbagallo)
10,50-11,10	Coffe break
11,10-11,30	Pulse shape discrimination in NE213 liquid scintillator detector (M. Cavallaro)
11,30-11,50	MONSTER (T. Martinez)
11,50-12,10	Neutron array at DESIR (F. Delaunay)
12,10-12,30	NEDA (N. Erduran)
12,30-14,30	Lunch

Thursday 21st of February

Time	Closed sessions
14,30-15,00	Follow up of ERINDA (H. Penttila)
15,00-15,45	WP1
15,45-16,15	WP2
16,15-16,45	Coffee break
16,45-17,20	WP3
17,20-17,50	WP4
17,50-18,50	WP5

Friday 22nd of February

Time	Closed sessions
9,30-10,10	ET enterprises (G. Sperrin)
10,10-11,10	WP6
11,10-11,40	Coffe break
11,40-12,10	WP7
12,10-12,40	Follow up: ENSAR (D. Cano-Ott/T. Martinez)
12,40-13,10	Summary and conclusions
13,10-15,00	Lunch

Thoughts on NEDENSAA

- Pool of knowledge on neutron detection from different groups with large expertise in neutron related issues.

- Within the NuPNET project there are involved various collaborations interested in building future neutron arrays: NEULAND, MONSTER, neutron detector for DESIR, NEDA

- The project has well defined milestones and in this framework the various groups are encourage to work together in common interests even if the final goal might differ from the various projects

- The kick-off meeting helped to make clear our interests and expertise to the other participants of the project and create synergies.

- This second meeting should report on the progress and strengthen the transversal collaboration and synergies

- The outcome of this project in NOT a future neutron detector array but the creation of a european net of neutron detection experts that collaborate together at large scale. The project will hopefully take us to a technological advance in neutron detection and will train young scientists.

- Follow up → ENSAR