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ACTIVITY REPORT 2017

Communication and Outreach

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SIDS - Scientific Information and Dissemination Service

The Frascati Outreach events are organized both inside LNF (Visits, Open Labs, Public Lectures, and special appointments addressed to high school teachers and students such as Incontri di Fisica and Stages) and outside the Laboratories (Seminars at schools, local libraries, etc).

1) VISITS to LNF are a well-established tradition. They consist of a brief historical presentation of the Laboratories and their activities, on site and abroad, and of a guided tour of the experimental areas. Visits are organized for both students in their last high school year and pupils (age: 10-14) and they usually last about 3 hours. Not just Italian schools but also schools from all over the world book visits. During 2017 about 10000 people came in LNF. edu.lnf.infn.it/guided-tours/?lang=en

2) [Edu]kids Program in 2017 LNF hosted about 600 kids having the chance to contribute to the growth of the interest of young generations in the fascinating and complex world of particle physics. The “Io dico l’Universo” program, which has been addressing its dissemination project to both primary and lower secondary schools for almost 20 years, includes the following proposals for any applicant school: guided tour of LNF, meeting a researcher at LNF but also at schools and public libraries, as well as specific activities designed for the little ones during the Open Days. http://www.lnf.infn.it/edu/kids/

3) OPENLABS - Playing with Science consisted of a full day program of guided tours inside the LNF, conferences, public lectures, expositions, scientific videos and a very rich program for kids. Most LNF employees were in action to present their research centre, answer questions and take care of their guests. About 2500 people visited the LNF on Saturday May 27th, 2017. 73 Students of Roman high schools and surroundings helped out the LNF Staff in ensuring the success of the event. http://www.lnf.infn.it/edu/openlabs/2017/

OpenLabs 2017 (INFN-LNF Photo) Lesson by Federico Benuzzi, physicist and performer

4) SEMINARS

- Seminars and Public Lectures "Pomeriggi di Scienza" aimed to high school students and the general public were held every month by important personalities of the scientific field at the LNF's Bruno Touschek Auditorium. http://edu.lnf.infn.it/appuntamenti-con-la-scienza-seminari-divulgativi-2017/

L'inseguimento Laser dei Satelliti e della Luna (S. Dell'Agnello, INFN-LNF); Tre piccioni con una fava: indagare i misteri per raccontare la scienza (S. Bagnasco, INFN - TO); Ospedale nucleare: cosa ci fa la fisica nucleare in un ospedale? (V. Patera, Univ. La Sapienza - Roma); A tu per tu con l'Intelligenza Artificiale (P. Mello, Univ. di Bologna); Il lato oscuro dell'Universo (D. Babusci, INFN-LNF; A. Berardinelli, critico letterario; F. Bossi, INFN-Lecce).

- Seminar @School
Upon request, many LNF researches also held lessons in schools and libraries.

In 2017 the Seminar and Public Lecture programs involved about 3800 people (schools and general public) from all over Italy.

5) TEACHER PROGRAMS

- Incontri di Fisica High school teachers course - has been organized since 2001.

194 high school teachers from all over Italy, could attend the XVII edition of a refresher course on Modern Physics. The teachers enrolled had the chance to choose among two different paths:
– IDF course 2.0 (e-learning + attendance at LNF)
– IDF course (attendance at LNF)
The goal is to stimulate the teachers' professional training and provide an occasion for interactive and hands-on participation in the latest developments in physics.

The online course includes 6 items: Pedagogy; Didactic Laboratory; Classical Physics Multimedial Laboratory; Physics Laboratory for schools; Modern Physics.

The program proposed in presence at LNF consists of plenary lessons, presentations of INFN-LNF activities, visits to LNF experimental area and discussions. The peculiarity of this course is represented by the working group (15 in 2017 edition) focused on a theoretical lesson followed by hands-on activity or data analysis of a real experiment. This way, teachers have a direct contact with researchers and get to use typical experimental instrumentation employed in contemporary physics.

Teachers, authorized by the Minister of Education, received a certificate of participation. In the case of IDF course 2.0 in blended modality, the University G. Marconi, partner of this event, also 6 university credits were released.
All the programs are published on the LNF web site (lessons, videos, photos).
LNF October 4th -6th, 2017. http://www.lnf.infn.it/edu/incontri/2017/

Incontri di Fisica 2.0, 2017 - (INFN-LNF Photo)

- Incontri di Fisica Moderna (IDFM). The course is a complement to Incontri di Fisica traditional one. It is structured in three modules and concerns Relativity, Quantum Mechanics and Cosmology for a total of 12 lessons. 60 high school teachers attended the course in the afternoons twice a month, from January to May 2017. http://edu.lnf.infn.it/idfm-incontri-di-fisica-moderna-nei-licei-scientifici-201617/

6) STUDENT PROGRAMS

- Stages for students – work related learning for high school students in their last years. They are selected by their teachers on the basis of their curriculum but, above all, on the basis of their interest and motivation.
In direct contact with their tutors students are involved in theoretical lessons and practical operations. They acquire knowledge and understanding of INFN research activities in an interactive modality. At the end of the stage they get a Certificate of Participation. www.lnf.infn.it/edu/stagelnf

The LNF offers a number of different stages and events:

- Stage MASTERCLASS is organized in partnership with the IPPOG Masterclasses International Project. It lasts 5 full days. 61students followed lessons on modern physics and analyzed data from the CMS and LHCb experiment at CERN.
LNF March 13th – 17th, 2017.

- INSPYRE 2017 International School on Modern PhYsics and Research. Open for 76 students in their last year(s) of high school/college, from 8 European countries. It lasts 5 days and it involves lectures on Modern Physics and its applications in our society and activities to be performed in laboratories. The official language is english.
Participants have, as well, the opportunity to visit the main experiments and accelerating facilities of the LNF.
LNF February 13th – 17th, 2017.

- SUMMER Stages are organized in June, at the end of the school year, and last 10 days. Summer Stages – 106 students - LNF June 6th -17th, 2016. The students, divided in small groups, joined 11 different experimental activities (Quantum Mechanics, Superconductivity, Cosmic Rays, Electronics, Computing, Mechanics, Data Analysis, Bio-Nanotechnology and Graphene, Communication of Science, Administration).

- Matinées di Scienza 7 lectures on Modern Physics with a scientific demonstration, were proposed to 830 last year high school students coming from all over Italy http://edu.lnf.infn.it/matinees-di-scienza-2017-lezioni-di-fisica-con-dimostrazioni-sperimentali/

Each lesson lasts 3 hours and students receive a certificate of attendance.

Arguments: Meccanica Quantistica, D. Babusci (INFN-LNF); Le Nanotecnologie nel mondo della biologia, S. Bellucci (INFN-LNF); Il mondo superconduttivo D. Di Gioacchino (INFN-LNF); Raggi cosmici: messaggeri dell'Universo (INFN-LNF); Gli acceleratori di particelle: dai microscopi subatomici a strumenti per la medicina, D. Alesini (INFN-LNF); I Raggi Cosmici: messaggeri dall'Universo, D. Domenici (INFN-LNF); Diagnostica per i Beni Culturali: metodi non distruttivi, A. Gorghinian (INFN-LNF); Come diventare cacciatori di raggi cosmici! Sensoristica nel palmo di una mano, C. Curceanu (INFN-LNF) e Valerio Bocci (INFN – Roma). From January to May 2017

- **International Day of Women and Girls in Science 2017.** On February 10th, 2017, in occasion of the "International Day of Women and Girls in Science" established by the UN General Assembly to promote STEM careers (Science, Technology, Engineering and Mathematics), LNF organized a special science matinée addressed to high school students in their last years.
http://edu.lnf.infn.it/international-day-of-women-and-girls-in-science-2017/

- **"Students in Staff" stages**. The students worked alongside the LNF staff in the organization of [educational] and dissemination events open to the public, getting to know the INFN-LNF research activities http://edu.lnf.infn.it/studenti-in-staff-e-percorsi-formativi-2017/

- **VISIT and CAREER DAY**. A day of guided tours and orientation addressed to students in their last year of high school who had the chance to get closer to representatives of the INFN research. Opportunities of both university and career paths in science and technology were illustrated. April 3th, 2017; http://edu.lnf.infn.it/stem-career-day-2017-old/

INSPYRE 2017 students – International School on Modern PhYsics and Resarch (INFN-LNF Photo)

Participation in the stages program has increased over the last 16 years: since 2000, **3446** students attended the stage. As shown in Tab. 1, in the year 2000 LNF hosted only 12 students from one local school, while in the year 2017, **376** students from 90 different schools all over Italy and from abroad came to Frascati.

Tab. 1

Year	Students	Females	Males	School	INFN Tutors
2000	12	1	11	1	7
2001	14	3	11	1	14
2002	57	15	42	8	50
2003	56	11	45	14	22
2004	114	34	80	21	25
2005	154	42	112	29	56
2006	161	48	113	46	58
2007	163	45	118	51	55
2008	161	47	114	51	63
2009	177	40	137	54	67
2010	166	36	130	60	60

2011	184	61	184	60	70
2012	206	59	147	72	59
2013	288	78	210	90	84
2014	395	144	251	93	86
2015	351	173	178	133	96
2016	411	157	254	131	85
2017	376	129	247	118	73

The LNF monitor the success of the various initiatives proposed, mostly through questionnaires (each one specific to the event) and keep track of the progresses using dedicated databases, thanks to whom it is possible to perform statistical analysis.

7) The LNF Web Editorial Board

The LNF Web Editorial Board was established in July 2017 by the Communications Office.
http://cdrweb.lnf.infn.it/

Its aim is to simplify and improve the development of web content in order to maintain the LNF web portal always up to date. This Editorial Board is made of different representatives of all the LNF divisions and services and the Director. Through regular meetings, e-mail correspondence and its own web page, the Web Editorial Board provides for the collection, editing and publication of the various news, dissemination articles and other texts and communications addressed both to the general public and the LNF personnel. In particular, an online form has been developed to easily submit a proposal of new content accompanied by all the material necessary to its publication (title, images, links…).

8) ACCENDISCIENZA - An e-learning portal for scientific dissemination

A new instrument of scientific culture diffusion: the e-learning platform ACCENDISCIENZA. This project, financed by **MIUR** (Ministry of Education, Universities and Research) has been completed thanks to the collaboration with Consorzio GARR– provider for development and optimization of Moodle platforms – and the online University "G. Marconi", leader in the e-learning sector.
Created to collect and freely make available lessons and seminars held at LNF, this web-portal contains four sections dedicated to its different targets: high school teachers, students, general public, kids and young people.
The main goal of the portal – which already has a few hundred subscribers – is to enhance and give more extensiveness to the activities organized every year by the Laboratory here in Frascati by enabling remote participation too. In addition, it will be a valuable support to traditional scientific teaching and education. https://accendiscienza.lnf.infn.it/

9) VISITOR CENTRE

An old building has been qualified and inaugurate in december to host a **Visitor Centre.** A team is studying a visit path illustrating the history of accelerators and detectors from their beginning to the future.

Thanks to an agreement with the Architecture Faculty of Sassari University, in a near future will also start the project for a **Science Centre,** a multi user building for Reseach and Dissemination. An entire area will be qualified including the Visitor Centre. The project is supported by the **International Evaluation Committee (CVI)**

Tab. 2 - Number of participants to LNF events during 2017

EVENTS (2017)	**PARTICIPANTS**
Visits	2300
OpenLabs	2500
Seminars and Public Lectures (at the LNF and outside)	3792
Teacher Program Incontri di Fisica e IDFM for high school teachers	237
Student Program: Stages for high school students	376
Science matinées for high school students	830
Visit and Career Day for high school students	530

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