NMI3-II

The Transnational Access Programme: a success story for more than 20 years

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What is the Transnational Access Programme?

User facilities (e.g. neutron, muon facilities) **provide beamtime** (access) to users from foreign countries (**transnational**)

Those users are **supported by Travel and Subsistence (T&S)** by the access programme based on criteria like scientific excellence

Facilities get **reimbursed by beam fees** (user fees)

Win – Win – Win situation:

for the users:

they can perform their experiments at world class facilities and get the best possible results

for the facilities:

they get partly re-imbursed for their immense operation costs (20 – 50 M€/year)

for the EC:

the access programme helps the EC to meet the **Grand Challenges** by hundreds of publications

Access programme – member facilities

6.7 M€

10 facilities

- 8 neutron sources
- 2 muon sources

+ ILL as coordinating facility

Facilities providing access:

Neutrons:

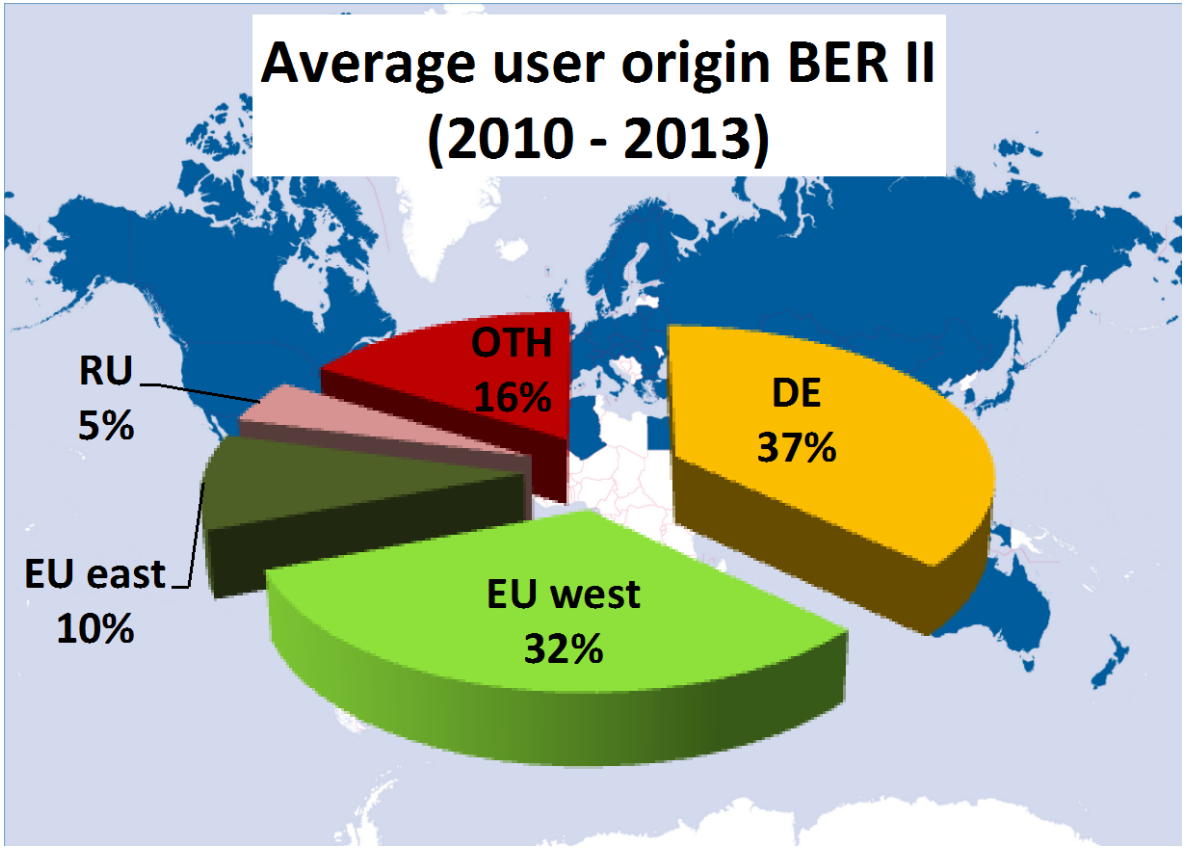
- FRM II, HZG, JCNS (Munich)
- HZB (Berlin)
- LLB (Paris)
- ISIS-neutrons (Rutherford)
- PSI-SINQ (Villigen)
- BRR (Budapest)
- RID (Delft)
- NPI (Prague)

- **ILL (coordinating facility)**

Muons:

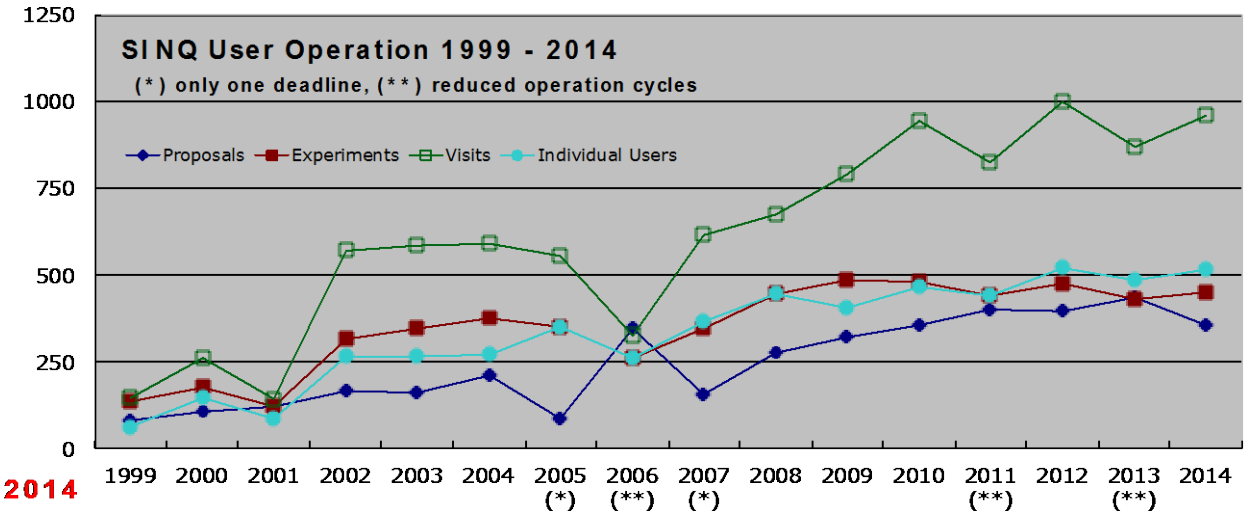
- ISIS-muons (Rutherford)
- PSI-SμS (Villigen)

Impact: origin of users, example BER-II (HZB)

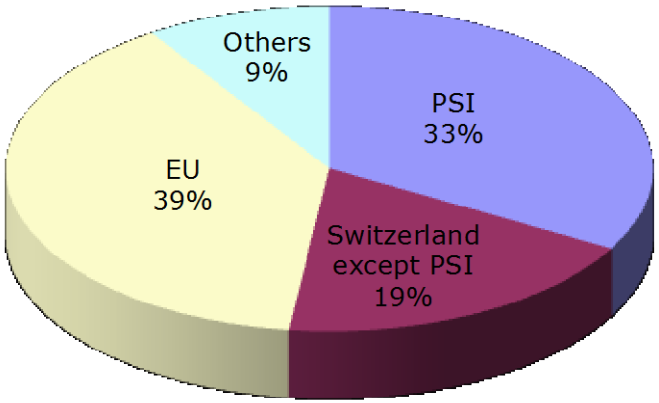


BER-II:
40-45% users from EC countries since 2005

Impact: origin of users, example SINQ (PSI)



Geographic distribution of SINQ users 2014



SINQ:
35-40%

Overview – NMI3-II access data

Parti-cipant number	Organisation short name	Short name of infrastructure	Operator country code	Min quantity of access to be provided	Estimated unit cost (€)	Fraction of unit cost charged to EC project	Estimated total quantity of access to be provided over project period	Estimated Access cost	Estimated number of experiment	Estimated cost per experiment (without T&S)	Estimated number of users	Estimated number of days spent at the facility	Estimated Travel & Subsistence cost incl indirect cost (7%)
2	**STFC**	ISIS Neutrons	UK	**68**	15865.75	100%	11004	1'078'871	**64**	16857	**125**	430	82'707
2	**STFC**	ISIS Muons	UK	**14**	15865.75	100%	11004	222'121	**13**	17086	**26**	90	18'748
3	**TUM**	FRM II	DE	**462**	3300	48.1%	21120	1'524'600	**120**	12705	**215**	660	71'043
5	**PSI**	SINQ	CH	**262**	2897	52.5%	6750	759'014	**80**	9488	**110**	550	62'543
5	**PSI**	SμS	CH	**123**	2898.72	63.2%	2700	356'543	**50**	7131	**65**	330	30'275
6	**HZB**	BER II	DE	**300**	2493.54	56.7%	19800	748'062	**75**	9974	**150**	975	120'947
7	**CEA**	LLB	FR	**271**	3352.94	70%	16560	908'647	**54**	16827	**92**	283	90'572
9	**MTA EK**	BRR	HU	**150**	1599.29	55%	1800	239'894	**32**	7497	**45**	210	28'959
12	**TUD**	RID	NL	**90**	2013	89%	6400	181'176	**10**	18118	**20**	9	19'211
13	**NPI**	NPI	CZ	**92**	1203.66	100%	2688	110'737	**10**	11074	**17**	112	13'749

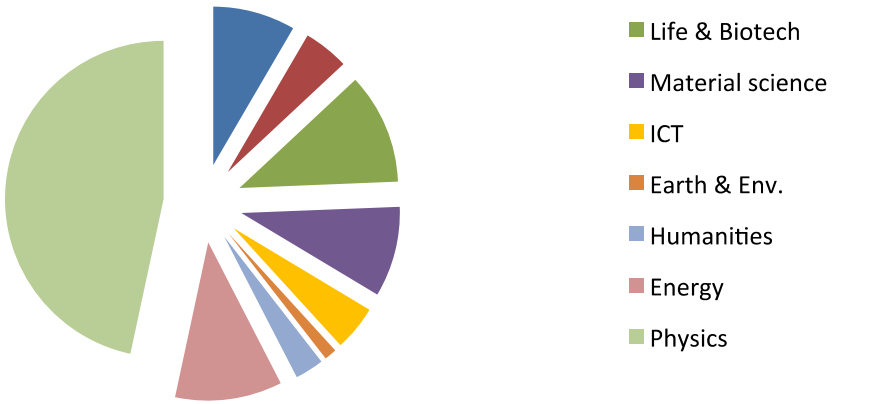
Minimum: 1800 days **500 expts** **850 users**

Overview – delivered days – PR1+PR2, ≤ Jan 2015 (75% of duration)

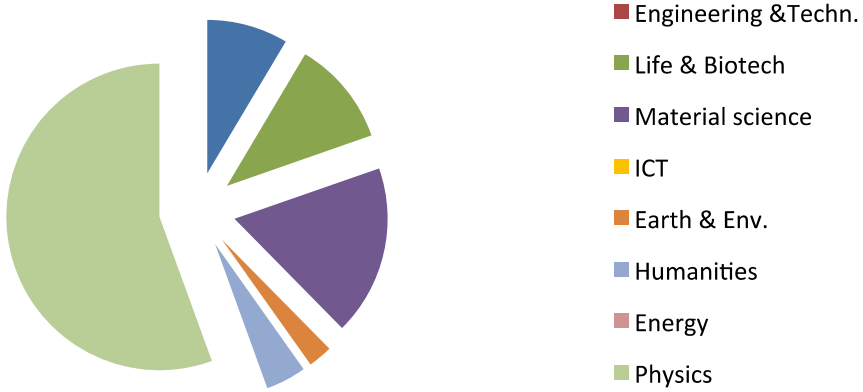
	eligible user projects	funded projects	beam days offered	beam days delivered	% delivered
STFC Neutrons	167+x	65	68	65	**96**
STFC Muons	59	14	14	14	**100**
TUM	238	238	462	1185	**257**
PSI SINQ	598	129	262	645	**246**
PSI SμS	295	56	123	205	**167**
HZB	312	117	300	699	**233**
CEA	19+x	53	271	305	**112**
MTA EK	73	40	150	212	**141**
TUD	17	13	90	89	**99**
NPI	25	13	92	114	**124**
Total	**≈2000**	**738**	**1832**	**3533**	**193**

Overview – scientific fields: physics plays a major role

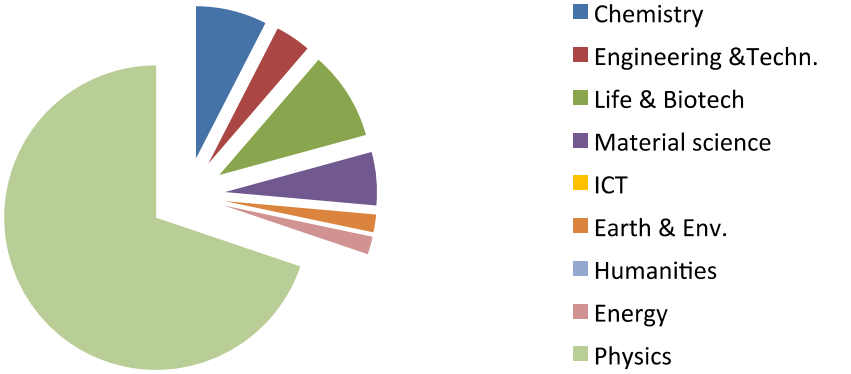
FRM II (MLZ)



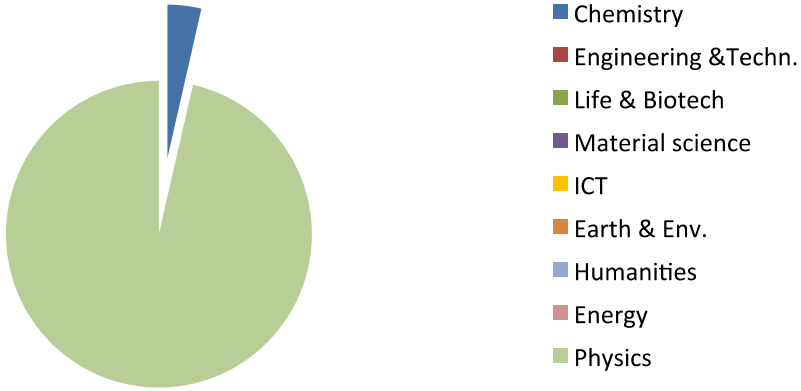
HZB



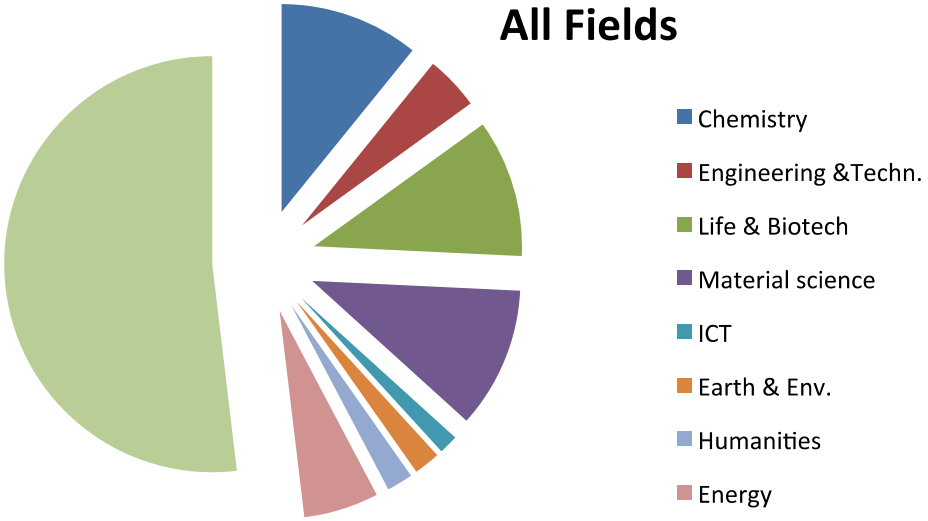
LLB



PSI SμS



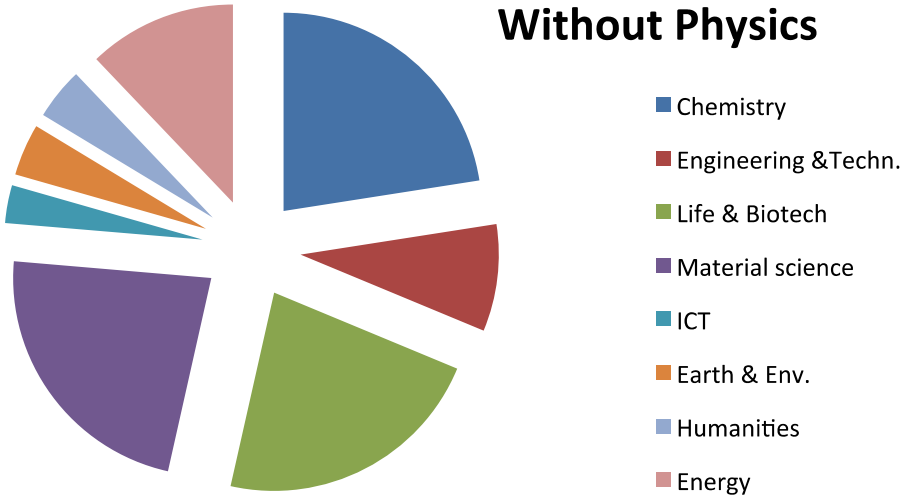
Overview – scientific fields – all facilities:



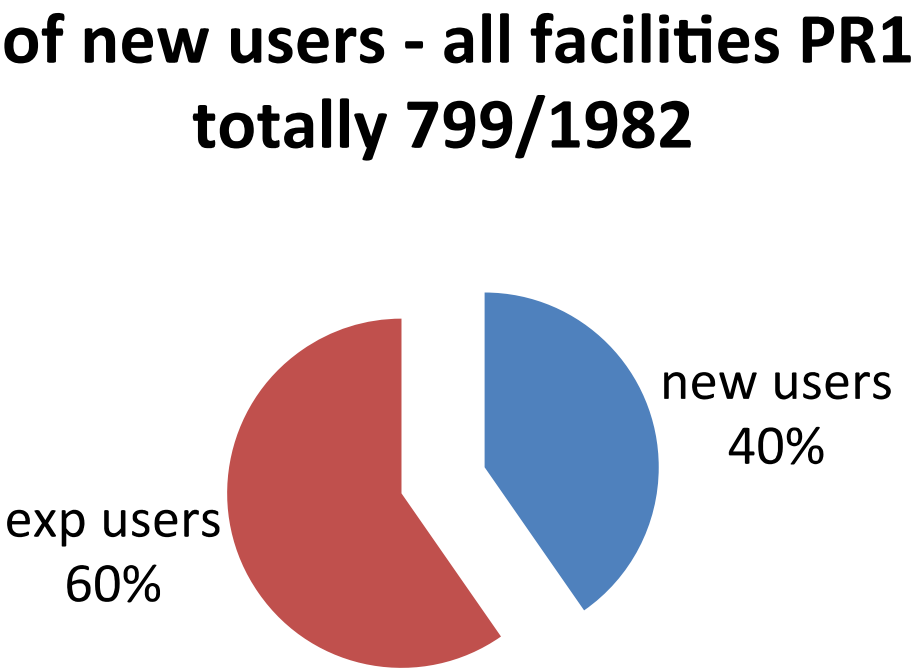
PR1 + PR2

without Physics:

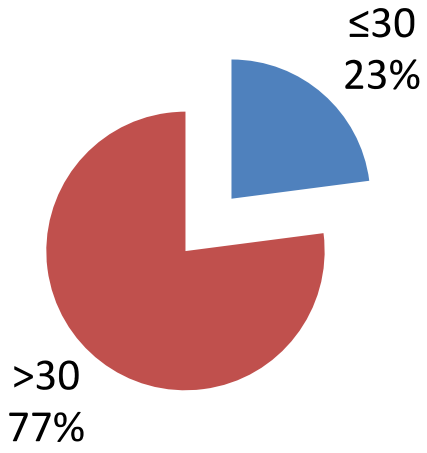
- Chemistry
- Materials science
- Life Sciences & Biotech
- ...



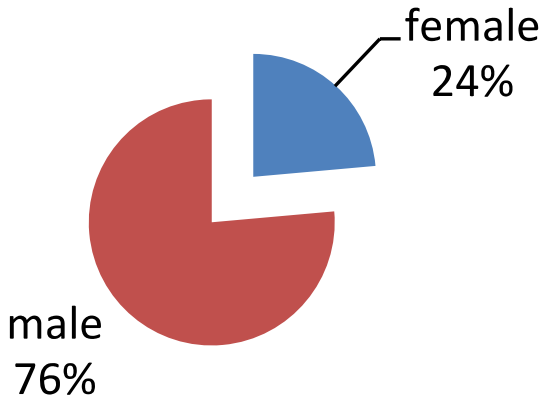
The access programme attracts many new neutron/muon users



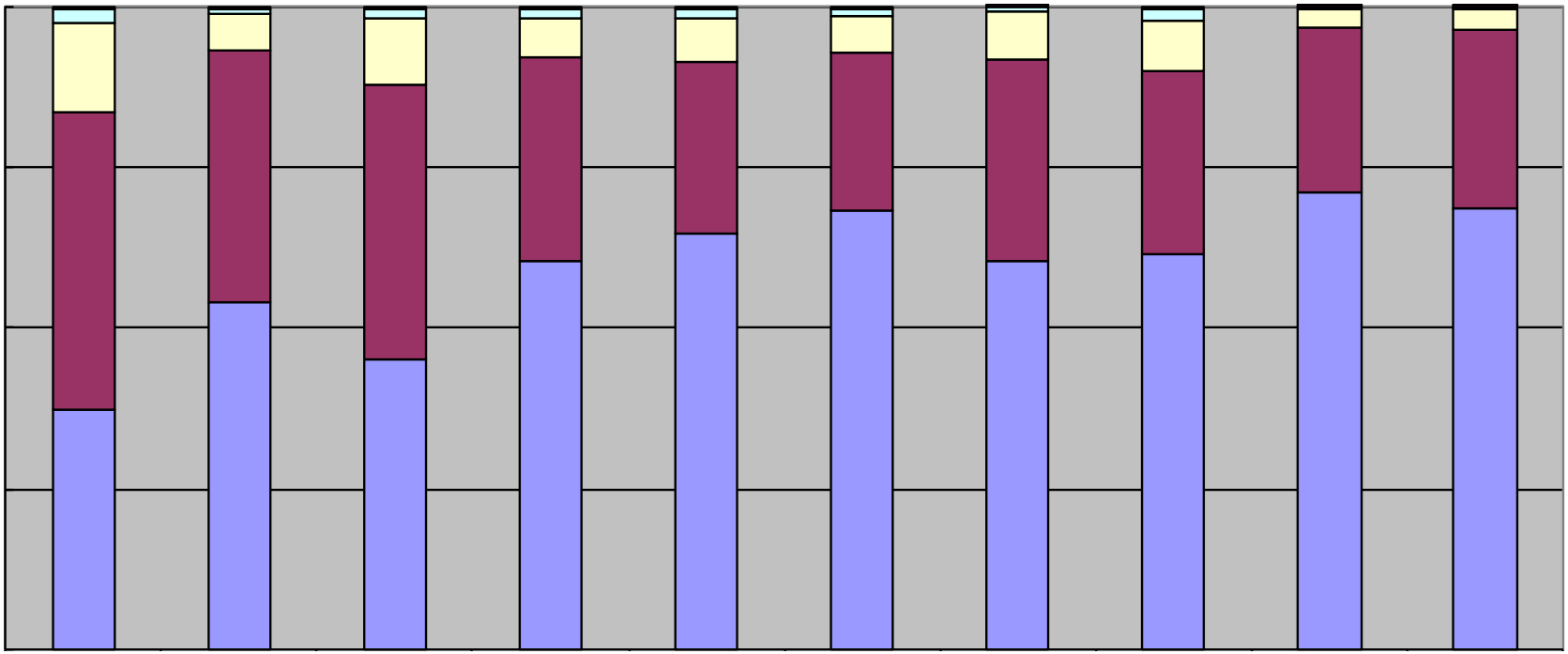
age of users - all facilities PR1+PR2
≤30: totally 455/1982



share of female users - all facilities PR1+PR2 totally 467/1982



User satisfaction feedbacks (EC), input from S. Jester

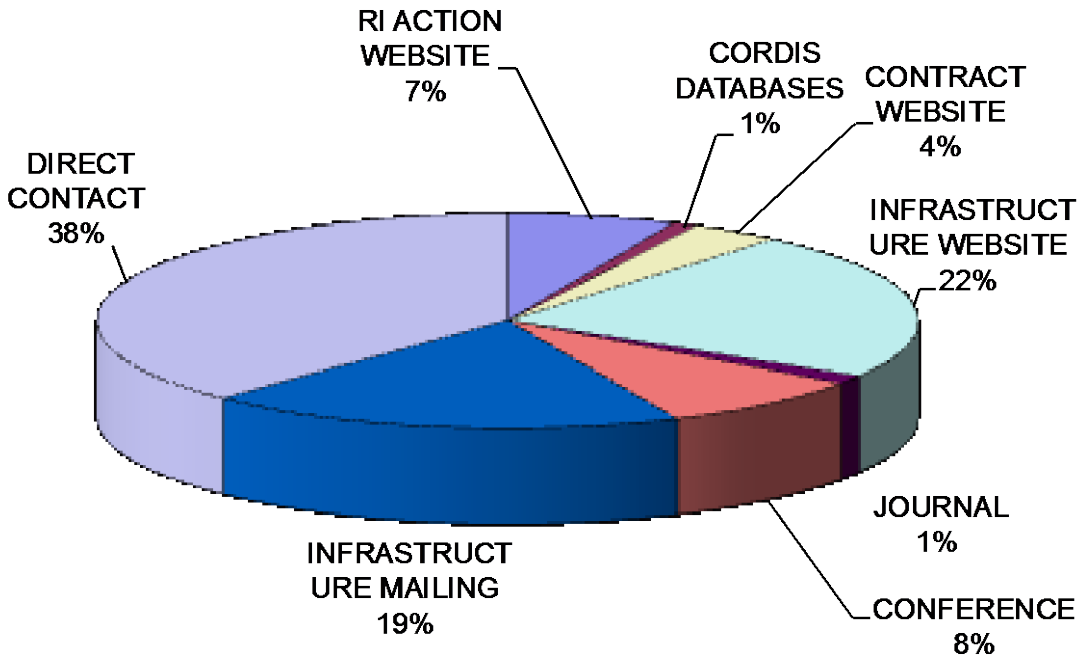


ry poor

Overall appreciation: very good: 71%, good: 25%

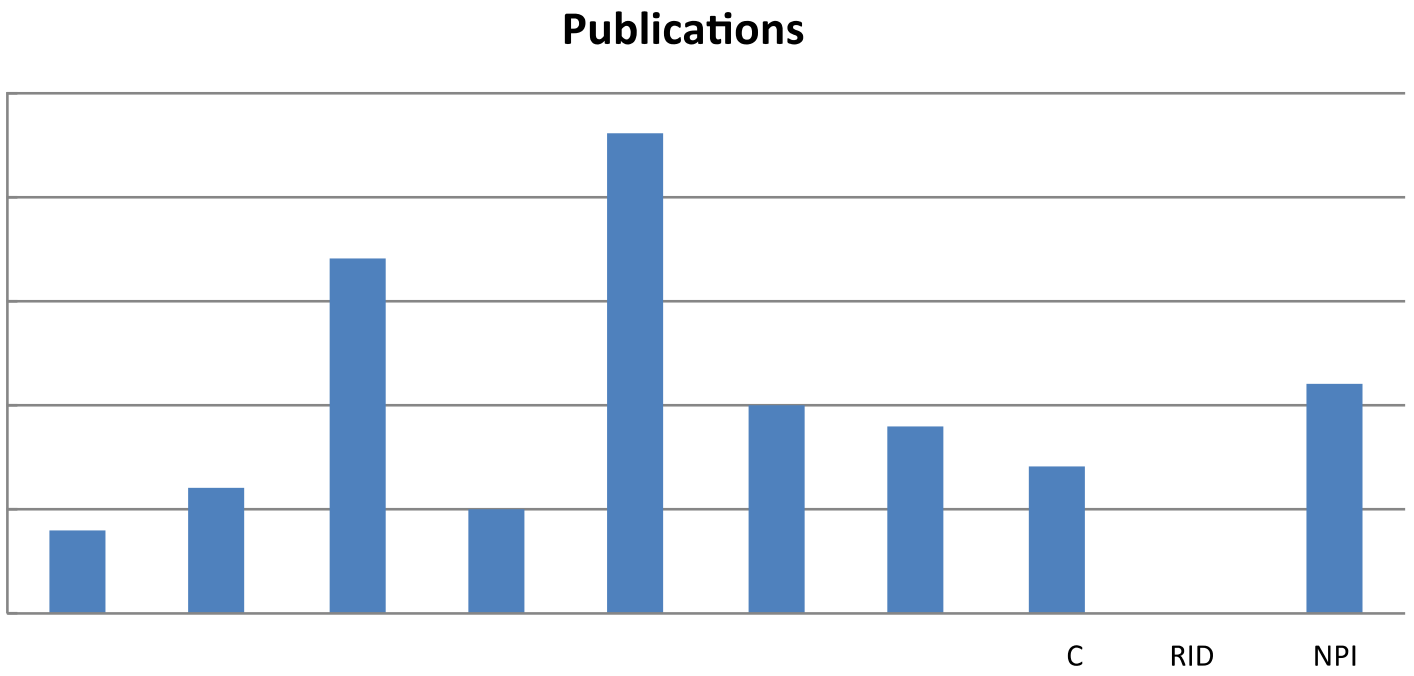
User satisfaction feedbacks (EC), input from S. Jester

How did you become aware of NMI3?



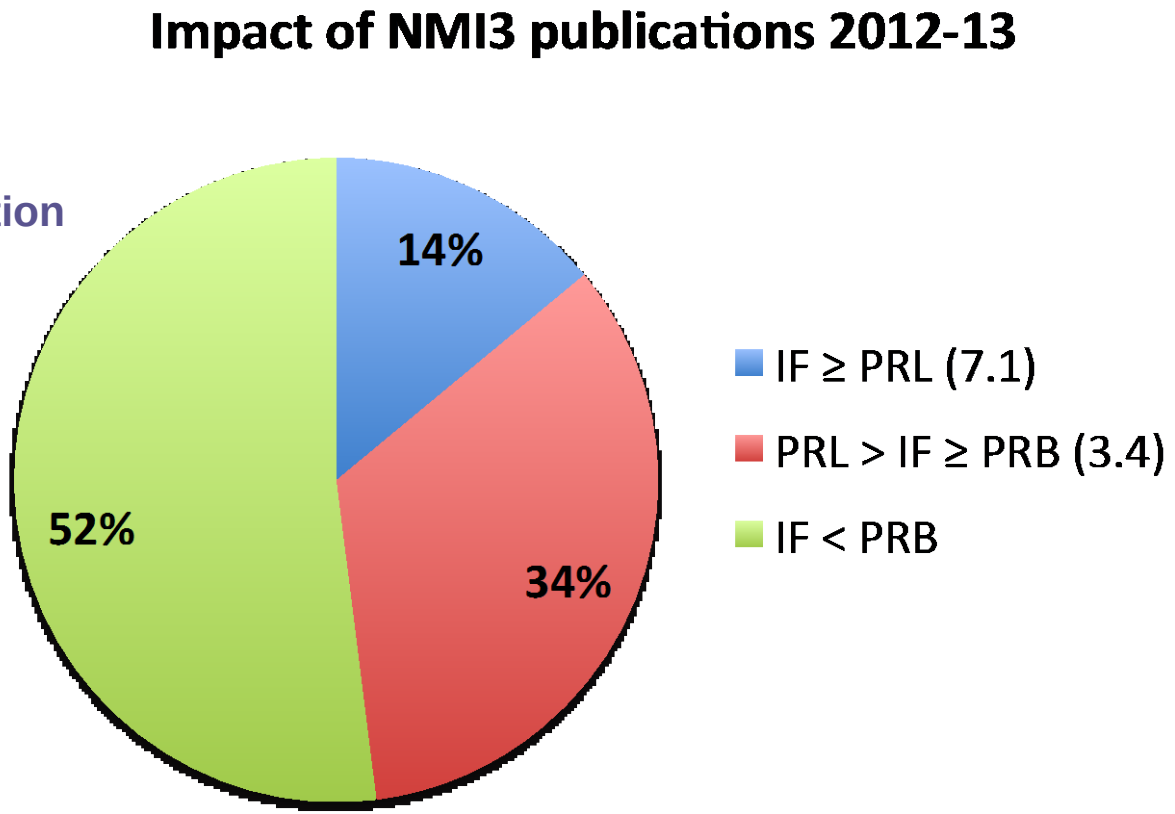
Scientific output: publications

PR1+PR2: > 90 publications based on NMI3 funded experiments have already been published

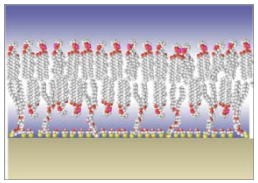


Impact of publications:

- Angew. Chemie – Int. Edition
- Physical Review Letters
- New Phytologist
- Soft Matter
- Langmuir
- Inorganic Chemistry
- J. Applied Cryst.
- Appl. Physics Letters
- Physical Review B
- .....



Scientific Highlights



Researchers suggest an enhanced method for the study of biological membranes

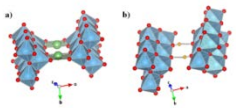
The analysis of cholesterol and lipids transfer shows the advantages of combining the methods of RSE and vesicle fusion to prepare tBLMs solid-supported membrane models. Aim is to produce robust, low-defect density membranes for, e.g. biosensor applications.

BioTech

Where and how do plant roots take up water?

Have you ever eaten lupins? They are a common snack in Mediterranean countries. Thanks to NMI3 funding, scientists have investigated where and how the roots of these plants take water from the soil.

BioTech



Investigating a new material for lithium rechargeable batteries

The analysis of data from synchrotron, neutron powder diffraction, and IR spectroscopy sheds light on the electrochemical properties of $H_2Ti_6O_{13}$. It revealed itself to be an interesting material for rechargeable lithium batteries.

Energy research

Healthy diet? Using neutrons to quantify selenium in cereal crops

Selenium is an essential micronutrient for human health, protecting e.g. against cardiovascular disease, asthma, male sterility and certain forms of cancer. Thanks to NMI3 funding, Portuguese researchers could assess its levels in the country's cereals and soils.

Food science / nutrition

Assessing exposure to pollution in industrial workplaces

In industrial settings, employees may be exposed to high concentrations of metals while working indoors. This situation might cause respiratory symptoms and lung diseases on short- and long-term. Neutrons give insights into the air quality in the workplace.

Environmental sciences

Transnational Access

*Members of the team from the University of Leicester, **UK** have received NMI3 support to conduct experiments at the MLZ, **Germany**.*

*M. Riccò, M. Aramini and C. Cavallari from the University of Parma **Italy** have received NMI3 support to conduct experiments at the ISIS Pulsed Muon Facility, **UK**.*

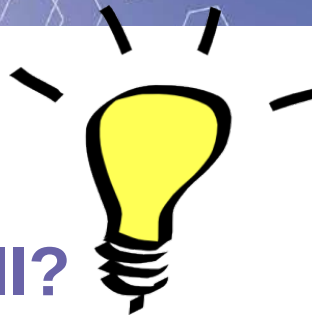
*Members of the team from the University of Copenhagen, **Denmark** have received NMI3 support to conduct experiments at the Helmholtz-Zentrum Berlin, **Germany**.*

*O.Z. and G.G. from the **Hungarian** Academy of Sciences have received NMI3 support to conduct experiments at the JCNS, **Germany**, and D.P. from the Roskilde University, **Denmark**, to conduct experiments at the BNC, **Hungary**.*

*Juri Agresti, Iacopo Osticioli and Salvatore Siano from the Istituto di Fisica Applicata "Nello Carrara"-CNR, **Italy**, Maria Cristina Guidotti from the Soprintendenza per i Beni Archeologici della Toscana, **Italy**, and Giuseppina Capriotti from the Istituto di Studi sul Mediterraneo Antico – CNR, **Italy**, have received NMI3 support to conduct experiments at HZB, **Germany**.*

I hope that EC lets us continue this success story NMI3-III

Quo vadis access?



New ideas for NMI3-III?

- Budget of access programs has been reduced consistently by the EC
- We only came into the new work programme by massive lobbying

- We need to come up with some new ideas, „continuation of“ will not be successful
- But not all ideas of the EC are really fruitful (joint review panel Biostruct-X, harmonization, ...)
- Do we need to accept every rule?

- **Suggestion (access 7 MEUR, JRA: 1.5 MEUR, Netw. 1.5 MEUR):**
  - 5.5 MEUR standard access program incl muons
  - 0.7 MEUR single entry point industry (1 FTE for 4 years plus travel as contact for industrial research)
  - 0.3 MEUR routes for fast fast access procedures
  - 0.5 MEUR strategy to compensate the shutdown of LLB and HZB