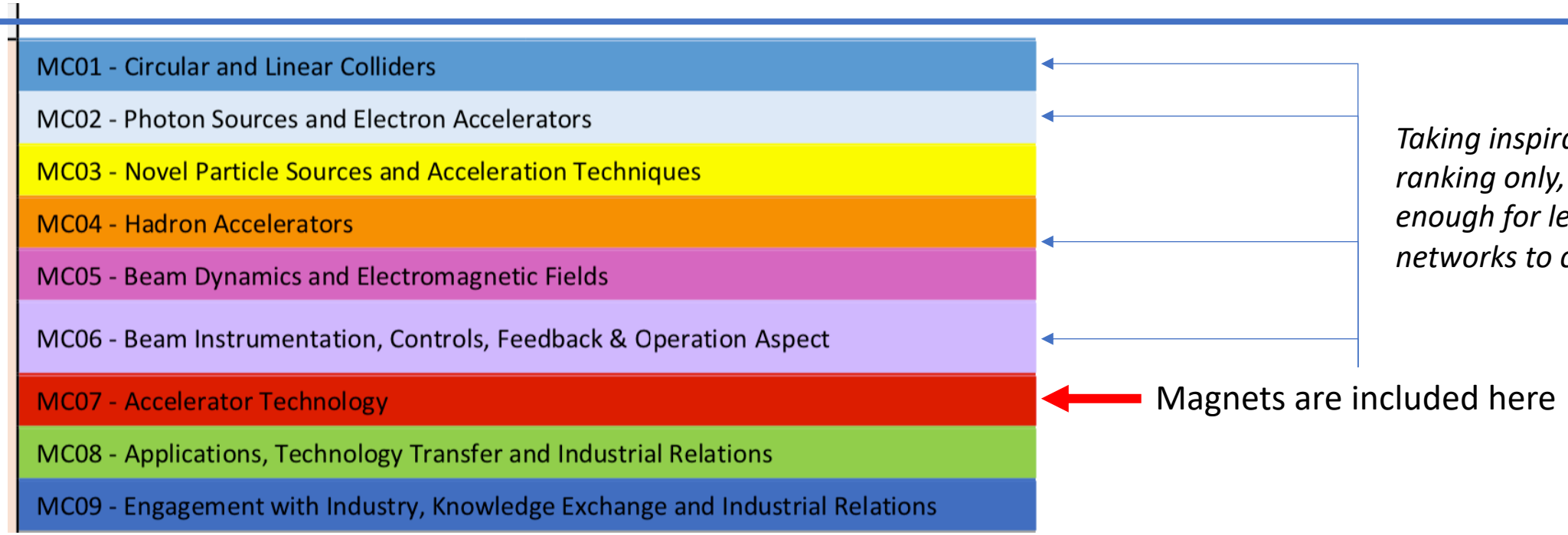
How to build-up a database: background and criteria

- Criticalities (in establishing sub-networks)
    1. Cross-disciplinary fields, by definition
    2. Small-groups and/or specific (but valuable!) competences in some labs/sections (e.g.: expertise about RF for cyclotrons is different from LINACS) → warning about under-mapping of them;
- Peculiarities (in figuring out the sub-networks)
    1. Our mapping should take profit of already existing “critical masses” inside INFN (e.g. SC magnets)
    2. Our mapping should exploit already existing “links” and sub-networks ”de-facto”
    3. Our mapping should include the wide know-how and expertise about accelerator-based applications (especially, but not only, about Medicine and C.H.)
- Inspiration (from criticalities and peculiarities analysis, and beyond):
    - IPAC topics in conference programs
    - Conferences worldwide about accelerators types and their sub-parts (IPAC, LINAC, ICIS, HB, etc.)
    - CERN Accelerator Schools (here, ranking and classification has its own specification: e.g., “small” vs. “big” accelerators
    - IOP categories (according to .xls file prepared by Giovanni)

How to start a mapping procedure:

IPAC conference sections and subsections



Taking inspiration from IPAC ranking only, it is probably not enough for letting INFN sub-networks to come out…

Mapping competences at a high degree of details is perhaps the only way for finding the best sub-network repartition

Let's try to see if and how sub-networks may **"self-emerge"** from a rigorous (hopefully) classification of competences and expertise across INFN sites

Existing Communities: a straight way to identify sub-networks… **but**… we want to go beyond!

https://www.conference-service.com/conferences/particle-accelerators.html

- ECR Ion Source Workshop
- International Conference on Ion Sources
- Heavy Ion Accelerator Technology
- Linac
- RF
- FEL
- Cyclotrons
- High Brightness
- TIPP 2020 — International Conference on Technology and Instrumentation in Particle Physics
- DLSR 2020 — 7th International Diffraction Limited Storage Ring Workshop
- AAC2020 — Advanced Accelerator Concepts Workshop
- Conference on Application of Accelerators in Research and Industry
- Euroschool on Exotic Beams 2020

In addition to the already well-established communities (roughly labelled by existing conferences/workshops) we can envisage cross-(existing)community links and build-up new networks

Very useful for breakthrough R&D and outreach towards applications!!

Coding strategy and grammar (ID)

AAA.*xxxxx*.**BBB**_ccc

NUMBER: Identify topics and sub-topics → Number of "*x*" equals sublevels/subtopics

Possible extension: "group"

AAA.*xxxxx*.**BBB**_ccc

Helps to define cross-field competences → towards sub-networks definition

Site (INFN section or lab)

NB:

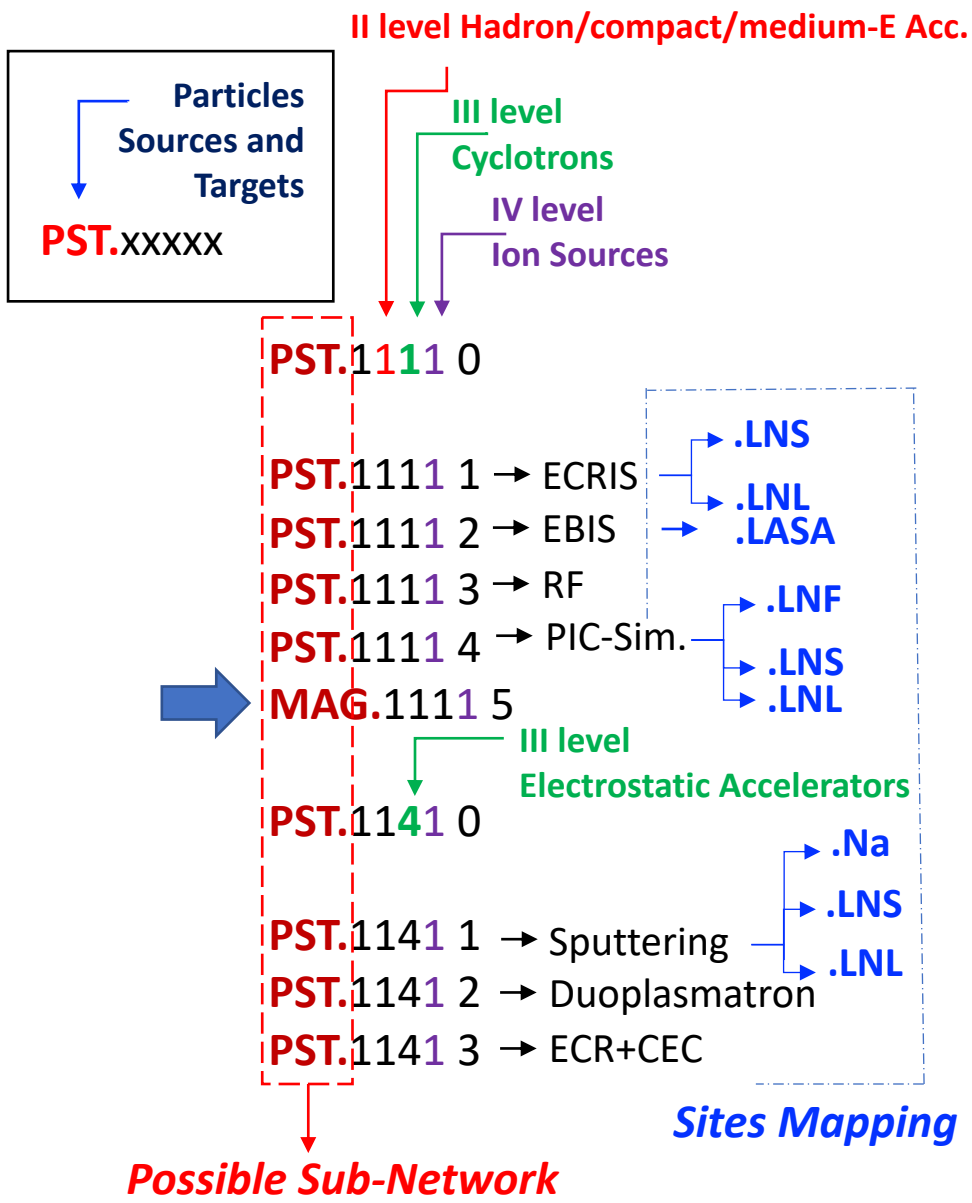
- A **query about AAA** can identify sub-networks
- A **query about BBB** can identify labs/sections
- A **query through *xxxxx*** identify main topics

Multi-layered database

	A	B	C	D	E	F	G	H
1								
2								
3	**Hadron/Compact/medium-E Accelerators** (according to CAS-SmallAcc schools and conferences)							
4	CAS.				11 000			
5	**Cyclotrons**		**Synchrotrons**		**LINACS**		**Electrostatic**	
6	CYC.	111 00	SYN.	112 00	LIN.	113 00	ESA.	113 00
7	**Sources**	PST.1111 0	**Sources**	PST.1121 0	**Sources**	PST.1131 0	**Sources**	PST.1111 0
8	ECR	PST.11111	ECR	PST.1121 1	MDIS	PST.1131 1	Sputtering	PST.11111
9	EBIS	PST.11112	EBIS	PST.1121 2	ECR	PST.1131 2	Duoplasmatr	PST.11112
10	RF		RF	PST.1121 3	RF	PST.1131 3	ECR+CEC	
11	PIC-sim	PST.11113	PIC-sim	PST.1121 4				
12	Magnets	MAG.11114	Magnets	MAG.1121 4				
13	**Magnets**	MAG.1112 0	**Magnets**	MAG.11220 0				
14	Permanent	MAG.1112 1						
15	SC	MAG.1112 2						

To be matched with bottom-up survey: add the extension **.BBB (sites)** and include:

- *existing projects*
- *instrumentation.*



Multi-layered database

This mapping is likely a bit over-moded…

BUT

It helps in finding small-size groups or specific competences

Accelerators Types and main subsystems — 1 0000

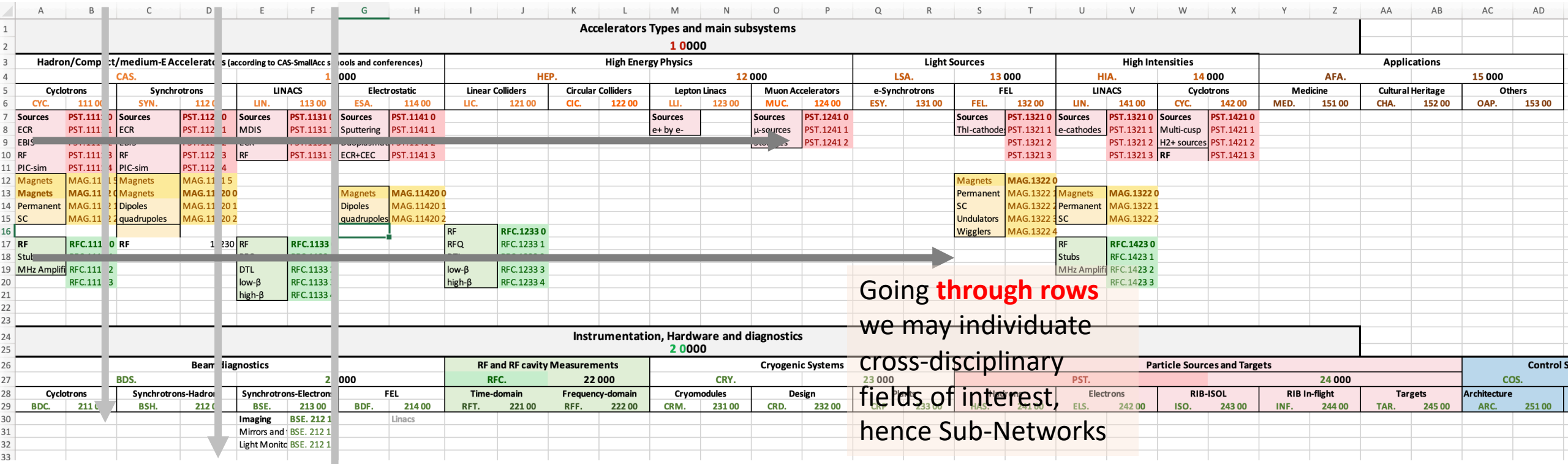
Hadron/Compact/medium-E Accelerators (according to CAS-SmallAcc schools and conferences)								High Energy Physics								Light Sources				High Intensities				Applications					
CAS.				11 000				HEP.				12 000				LSA.		13 000		HIA.		14 000		AFA.			15 000		
Cyclotrons		Synchrotrons		LINACS		Electrostatic		Linear Colliders		Circular Colliders		Lepton Linacs		Muon Accelerators		e-Synchrotrons		FEL		LINACS		Cyclotrons		Medicine		Cultural Heritage		Others	
CYC.	111 00	SYN.	112 00	LIN.	113 00	ESA.	114 00	LIC.	121 00	CIC.	122 00	LLI.	123 00	MUC.	124 00	ESY.	131 00	FEL.	132 00	LIN.	141 00	CYC.	142 00	MED.	151 00	CHA.	152 00	OAP.	153 00
Sources	PST.1111 0	Sources	PST.1121 0	Sources	PST.1131 0	Sources	PST.1141 0					Sources		Sources	PST.1241 0			Sources	PST.1321 0	Sources	PST.1321 0	Sources	PST.1421 0						
ECR	PST.1111 1	ECR	PST.1121 1	MDIS	PST.1131 1	Sputtering	PST.1141 1					e+ by e-		μ-sources	PST.1241 1			ThI-cathode	PST.1321 1	e-cathodes	PST.1321 1	Multi-cusp	PST.1421 1						
EBIS	PST.1111 2	EBIS	PST.1121 2	ECR	PST.1131 2	Duoplasmat	PST.1141 2							Storages	PST.1241 2				PST.1321 2		PST.1321 2	H2+ sources	PST.1421 2						
RF	PST.1111 3	RF	PST.1121 3	RF	PST.1131 3	ECR+CEC	PST.1141 3												PST.1321 3		PST.1321 3	RF	PST.1421 3						
PIC-sim	PST.1111 4	PIC-sim	PST.1121 4																										
Magnets	MAG.1111 5	Magnets	MAG.1121 5															Magnets	MAG.1322 0										
Magnets	MAG.1112 0	Magnets	MAG.11220 0			Magnets	MAG.11420 0											Permanent	MAG.1322 1	Magnets	MAG.1322 0								
Permanent	MAG.1112 1	Dipoles	MAG.11220 1			Dipoles	MAG.11420 1											SC	MAG.1322 2	Permanent	MAG.1322 1								
SC	MAG.1112 2	quadrupoles	MAG.11220 2			quadrupoles	MAG.11420 2											Undulators	MAG.1322 3	SC	MAG.1322 2								
								RF	RFC.1233 0									Wigglers	MAG.1322 4										
RF	RFC.1113 0	RF	11230	RF	RFC.1133 0			RFQ	RFC.1233 1											RF	RFC.1423 0								
Stubs	RFC.1113 1			RFQ	RFC.1133 1			DTL	RFC.1233 2											Stubs	RFC.1423 1								
MHz Amplifi	RFC.1113 2			DTL	RFC.1133 2			low-β	RFC.1233 3											MHz Amplifi	RFC.1423 2								
	RFC.1113 3			low-β	RFC.1133 3			high-β	RFC.1233 4												RFC.1423 3								
				high-β	RFC.1133 4																								

Instrumentation, Hardware and diagnostics — 2 0000

Beam diagnostics								RF and RF cavity Measurements				Cryogenic Systems						Particle Sources and Targets										Control S	
BDS.				21 000				RFC.		22 000		CRY.			23 000			PST.			24 000							COS.	
Cyclotrons		Synchrotrons-Hadrons		Synchrotrons-Electrons		FEL		Time-domain		Frequency-domain		Cryomodules		Design		Plants		Hadrons		Electrons		RIB-ISOL		RIB In-flight		Targets		Architecture	
BDC.	211 00	BSH.	212 00	BSE.	213 00	BDF.	214 00	RFT.	221 00	RFF.	222 00	CRM.	231 00	CRD.	232 00	CRP	233 00	HAS.	241 00	ELS.	242 00	ISO.	243 00	INF.	244 00	TAR.	245 00	ARC.	251 00
				Imaging	BSE. 212 10		Linacs																						
				Mirrors and	BSE. 212 11																								
				Light Monito	BSE. 212 12																								

- **RFC** individuated a network of groups and competences in RF systems and RF cavities that are cross-distributed among different accelerators types, using different methodologies and maybe instruments
- "*xxxxx*" identify the accelerator and/or the use of any **RFC**-like technology/component in a specific subfield.

How a precise ID can help finding SN: going through columns vs. through rows



Going **through rows** we may individuate cross-disciplinary fields of interest, hence Sub-Networks

Going **through the columns** we roughly explore existing communities worldwide

Colums are more “naturally” connected to existing communities/conferences

Map status

F55 | CLS.1136 00

Accelerators Types and main subsystems — 1 00000

Hadron Accelerators — HAA. 11 0000										High Energy Physics — HEP. 12 000								Novel Sources and New Acceleration Techiques																	
																		Laser Plasma Acceleration — LPA. 13 000								Weakfield Dielectric — WDL. 14 0000				Dielectric Laser Accelerators — DLA. 15 0000			
																		Weakfield — WEA. 131 000		Self-injection — SIN. 132 000		TNSA — TNS. 133 000		Radiative Pressure — RAD. 134 000						Electrons — DLE. 151 000		Ions — DLI.	
Cyclotrons — CYC. 111 000		Synchrotrons — SYN. 112 000		LINACS and beam lines — LIN. 113 000		Electrostatic — ESA. 114 000		Radioactive Beams production — RIB. 115 000		Linear Colliders — LIC. 121 000		Circular Colliders — CIC. 122 000		Lepton Linacs — LLI. 123 000		Muon Accelerators — MUC. 124 000																			
Acc.Physics	1110 00	Accelerators Physics	1120 00	Accelerators and Beam Physics	ABP.1130 00	Accelerators Phy	1140 00	Accelerators Physics	1150 00	Accelerators Physics	1210 00	Accelerators Physics	1220 00	Accelerators Physics	1230 00	Accelerators Physics	1240 00	Accelerators Physics	1310 00	Accelerators Physics	1320 00	Accelerators Physics	1330 00	Accelerators Physics	1340 00	Accelerators Physics				Accelerators Physics			
Studi e modelli teorici	ABP.111000 01			Studi e modelli teorici	ABP.1130 00 01													numerical simulations		numerical simulations		numerical simulations						numerical simulations		numerical simulations	
Modellizzazione traspo	ABP.111000 02			Modellizzazione trasporto	ABP.1130 00 02																										
Sources	PST.1111 00	Sources	PST.1121 00	Sources	PST.1131 00	Sources	PST.1141 00	Methods and Sources	PST.1151 00	Sources	PST.1211 00	Sources	PST.1221 00	Sources	PST.1231 00	Sources	PST.1241 00																		
ECR	PST.1111 01	ECR	PST.1121 01	MDIS	PST.1131 01	Sputtering	PST.1141 01	ISOL	PST.1151 01					e+ by e-	PST.1231 01	μ-sources	PST.1241 01													Sources	PST.1511 00	Sources	PS
EBIS	PST.1111 02	EBIS	PST.1121 02	ECR	PST.1131 02	Duoplasmatron	PST.1141 02	In-flight	PST.1151 02							Storages	PST.1241 02																
RF	PST.1111 03	RF	PST.1121 03	RF	PST.1131 03	ECR+CEC	PST.1141 03	Laser ionization	PST.1151 03							Capture solenoid	MAG.1241 01													RF	RFC.1512 00	RF	
PIC-sim	PST.1111 04	PIC-sim	PST.1121 04					Hot cathode	PST.1151 04																								
Magnets	MAG.1111 05	Magnets	MAG.1121 05					ECR	PST.1151 05																								
								EBIS	PST.1151 06																								
Magnets	MAG.1112 00	Magnets	MAG.11220 00	Magnets	MAG.11320 00	Magnets	MAG.11420 00	RF	PST.1151 07																								
Permanent	MAG.1112 01	Dipoles	MAG.11220 01	Dipoles	MAG.11320 01	Dipoles	MAG.11420 01	PIC-sim	PST.1151 08							Magnets	MAG.1242 00																
SC	MAG.1112 02	quadrupoles	MAG.11220 02	quadrupoles	MAG.11320 02	quadrupoles	MAG.11420 02	Surface Ion Source	PST.1151 09							Dipoles	MAG.1242 01																
				permanent	MAG.11320 03			FEBIAD	PST.1151 10	RF	RFC.1233 00					Quadrupoles	MAG.1242 02																
				Modellizzazione dipoli e lenti	MAG.11320 04			Plasma Ion Source	PST.1151 11																								
					MAG.11320 05			Laser Ion Source	PST.1151 12																								
RF	RFC.1113 00	RF	11230					Innovative Sources	PST.1151 13	RFQ	RFC.1233 01																				
MHz Cavities	RFC.1113 01			RF	RFC.1133 00			Magnets	MAG.11520 00	DTL	RFC.1233 02																				
MHz Amplifiers	RFC.1113 02			RFQ	RFC.1133 01			Isotope Separators	MAG.11520 01	low-β	RFC.1233 03																				
Choppers	RFC.1113 03			DTL	RFC.1133 02					high-β	RFC.1233 04																				
				NC-low-β	RFC.1133 03			ES lenses and dipoles	ES.11530 00																								
				NC-high-β	RFC.1133 04																												
				SC-low-β	RFC.1133 05																												
				SC-high-β	RFC.1133 06																												
				Couplers and tuners	RFC.1133 07																												
				RF Amplifiers	RFC.1133 08																												
				Cavity RF simulations	RFC.1133 09																												
				Cavity mechanical design	RFC.1133 10																												
Extraction Systems	EXS.1114 00	Extraction Systems	EXS.1124 00	Extraction Systems	EXS.1134 00	Extraction Syste	EXS.1144 00	Targets	EXS.1154 00	Extraction Systems	EXS.1214 00	Extraction Systems	EXS.1224 00	Extraction Systems	EXS.1234 00	Extraction Systems	EXS.1244 00	Extraction Systems	EXS.1124 00	Extraction Systems	EXS.1124 00	Extraction Systems	EXS.1124 00	Extraction Systems	EXS.1124 00								
Beam diagnostics	BDS.1115 00	Beam diagnostics	BDS.1125 00	Beam diagnostics	BDS.1135 00	Beam diagnostic	BDS.1145 00	Beam diagnostics	BDS.1155 00	Beam diagnostics	BDS.1215 00	Beam diagnostics	BDS.1225 00	Beam diagnostics	BDS.1235 00	Beam diagnostics	BDS.1245 00	Diagnostics	LPD.1315 00	Diagnostics	LPD.1325 00	Diagnostics	LPD.1335 00	Diagnostics	LPD.1345 00	Beam diagnostics	BDS.1415 00	Beam diagnostics	BDS.1415 00	Beam diagnostics	BDS.1515 00	Beam diagnostics	
				Beam profilers	BDS.1135 01																												
				Current monitors	BDS.1135 02																												
				Time detectors	BDS.1135 03																												
				Energy detectors	BDS.1135 04																												
Control Systems	CLS.1116 00	Control Systems	CLS.1126 00	Control Systems	CLS.1136 00	Control Systems	CLS.1146 00	Control Systems	CLS.1156 00	Control Systems	CLS.1216 00	Control Systems	CLS.1226 00	Control Systems	CLS.1236 00	Control Systems	CLS.1246 00																
Architecture		Architecture		Architecture	CLS.1136 01			Architecture	CLS.1156 01					Architecture																		
Databases		Databases		Databases	CLS.1136 02			Databases	CLS.1156 02					Databases																		
Timing		Timing		Timing	CLS.1136 03			Timing	CLS.1156 03					Timing																		
				Control System and MPS HW architecture	CLS.1136 04																												
				Control System and MPS SW architecture	CLS.1136 05																												
				PPS implementation management	CLS.1136 06																												
Cryogenic Systems	CRY.1117 00	Cryogenic Systems	CRY.1126 00	Cryogenic Systems	CRY.1136 00					Cryogenic Systems	CRY.1217 00	Cryogenic Systems	CRY.1227 00	Cryogenic Systems	CRY.1237 00	Cryogenic Systems	CRY.1247 00																
				Refrigerators	CRY.1136 01																												
				Liquifiers	CRY.1136 02																												
				Cryomodules	CRY.1136 03																												
				Cryogenic Control Systems	CRY.1136 04																												
Radioprot.&Safety	RAS.1118 00	Radioprot.&Safety	RAS.1128 00	Radioprot.&Safety	RAS.1138 00	Radioprot.&Safe	RAS.1147 00	Radioprot.&Safety	RAS.1116 00	Radioprot.&Safety	RAS.1218 00	Radioprot.&Safety	CRY.1228 00	Radioprot.&Safety	CRY.1238 00	Radioprot.&Safety	CRY.1248 00																
Targets	TAR.1119 00	Targets	TAR.1129 00	Targets	TAR.1139 00	Targets	TAR.1149 00	Targets	TAR.1159 00													Targets	TAR.1339 00									

INFN | LNS | LNL | LNF | +

Exploring the map

A2 =SINISTRA(F2;3)

	A	B	C	D	E	F	G
1	Area di competenza	Sottocategoria	Struttura	Categoria Acceleratore	Tipo Acceleratore	Codice	Note
2	RFC	1133 06	LNL	Hadron Accelerators		RFC.1133 06_LNL	2.3.1 Gruppo Keppel, produzione studi di cavità SC per coating
3	RFC	1133 01	LNL	Hadron Accelerators		RFC.1133 01_LNL	2.3.2 RFQ per IFMIF e DONES, alta potenza di fascio (625 kW), RFQ a 200 kW per MUNES
4	RFC	1133 02	LNL	Hadron Accelerators		RFC.1133 02_LNL	2.3.2 DTL 90 MeV 62,5 mA per ESS (DC 4%)
5	TAR	1139 00	LNL	Hadron Accelerators		TAR.1139 00_LNL	2.3.2 Bersaglio di Be-V per progetto MUNES; moderatore termico acqua-grafite
6	CLS	1136 01	LNL	Hadron Accelerators		CLS.1136 01_LNL	2.3.2 Architettura di controllo per progetto MUNES, linac ALPI
7	CLS	1155 01	LNL	Hadron Accelerators		CLS.1155 01_LNL	2.3.2 Architettura di controllo per progetto SPES
8	MAG	11320 0	LNL	Hadron Accelerators		MAG.11320 01_LN	2.3.2 Sviluppo dipoli ad alto potere risolvente per linacs
9	MAG	11320 0	LNL	Hadron Accelerators		MAG.11320 02_LN	2.3.2 Sviluppo magneti per linee di trasporto a bassa energia e alta corrente
10	PST	1131 03	LNL	Hadron Accelerators		PST.1131 03_LNL	2.3.2 Sviluppo sorgenti di ioni ad alta intensità (MUNES)
11	ABP	1130 00	LNL	Hadron Accelerators		ABP.1130 00 02_LN	2.3.2 Modellizzazione computazionale multifisica fasci di alta intensità e bassa energia
12	ABP	1130 00	LNL	Hadron Accelerators		ABP.1130 00 01_LN	2.3.2 Modelli teorici, beam dynamics in fasci di alta intensità e bassa energia
13	BDS	1135 01	LNL	Hadron Accelerators		BDS.1135 01_LNL	2.3.2 Profilatori a gas residuo
14	BDS	1135 03	LNL	Hadron Accelerators		BDS.1135 03_LNL	2.3.2 Rivelatori lunghezza temporale di un bunch
15	RFC	1133 07	LNL	Hadron Accelerators		RFC.1133 07_LNL	2.3.2 Modelli ed algoritmi per accordo in f di RFQ 4-vane (doppia parola chiave qui, tuner e RFQ)
16	RFC	1133 08	LNL	Hadron Accelerators		RFC.1133 08_LNL	2.3.2 Amplificatori in bande VHF e UHF a valvole e a stato solido
17	ALI	113A 01	LNL	Hadron Accelerators		ALI.113A 01_LNL	2.3.2 Laser tracking su acceleratori lineari
18	MAG	11320 0	LNL	Hadron Accelerators		MAG.11320 03_LN	2.3.2 Magneti permanenti per linacs
19	RFC	1133 09	LNL	Hadron Accelerators		RFC.1133 09_LNL	2.3.2 Simulazioni di cavità acceleranti e componenti RF associati
20	CLS	1136 01	LNL	Hadron Accelerators		CLS.1136 01_LNL	2.3.2 Architettura di controllo basata su EPICS
21	CLS	1136 01	LNL	Hadron Accelerators		CLS.1136 01_LNL	2.3.2 Architettura di controllo basata su PLC
22	CLS	1136 01	LNL	Hadron Accelerators		CLS.1136 01_LNL	2.3.2 Amministrazione di architettura di rete
23	RFC	1133 10	LNL	Hadron Accelerators		RFC.1133 10_LNL	2.3.2 Progettazione meccanica di componenti per acceleratori NC, utilizzo di SW dedicato, caratterizzazione metrologica, progettazione termo-strutturale, brasature in vuoto e saldature a fascio di elettroni
24	CRY	1136 01	LNL	Hadron Accelerators		CRY.1136 01_LNL	2.3.3 Refrigeratori Air Liquide e Linde, gestione e manutenzione turbine e impianto di compressione e purificazione
25	CRY	1136 02	LNL	Hadron Accelerators		CRY.1136 02_LNL	2.3.3 Liquefattore Linde, gestione e manutenzione turbine e impianto di compressione e purificazione
26	CRY	1136 03	LNL	Hadron Accelerators		CRY.1136 03_LNL	2.3.3 Progettazione e manutenzione di criostati per cavità SC
27	CRY	1136 04	LNL	Hadron Accelerators		CRY.1136 04_LNL	2.3.3 Sistemi di controllo per criogenia basati su CERN-UNICOS

Exploring the map

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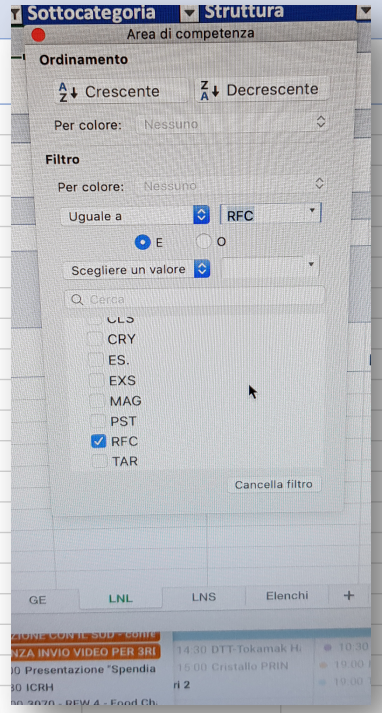
3	RFC	1133 01	LNL	Hadron Accelerators		RFC.1133 01_LNL	2.3.2 RFQ per IFMIF e DONES, alta potenza di fascio (625 kW), RFQ a 200 kW per MUNES
4	RFC	1133 02	LNL	Hadron Accelerators		RFC.1133 02_LNL	2.3.2 DTL 90 MeV 62,5 mA per ESS (DC 4%)
15	RFC	1133 07	LNL	Hadron Accelerators		RFC.1133 07_LNL	2.3.2 Modelli ed algoritmi per accordo in f di RFQ 4-vane (doppia parola chiave qui, tuner e RFQ)
16	RFC	1133 08	LNL	Hadron Accelerators		RFC.1133 08_LNL	2.3.2 Amplificatori in bande VHF e UHF a valvole e a stato solido
19	RFC	1133 09	LNL	Hadron Accelerators		RFC.1133 09_LNL	2.3.2 Simulazioni di cavità acceleranti e componenti RF associati
23	RFC			Hadron Accelerators		RFC.1133 10_LNL	2.3.2 Progettazione meccanica di componenti per acceleratori NC, utilizzo di SW dedicato, caratterizzazione metrologica, progettazione termo-strutturale, brasature in vuoto e saldature a fascio di elettroni
43	RFC			Hadron Accelerators		RFC.1133 05_LNL	2.3.7 SC cavities (RFQs, low beta low current resonators) design, construction, operation



An additional layer: industrial partners

HOME | ABOUT | STRATEGY | TECHNOLOGY INFRASTRUCTURE | INDUSTRY | CAREERS

- D2.3 Report on propositions to guarantee the long term sustainability of TIs

WP3. COOPERATION

- D3.1 Report defining the eligibility criteria for accessing to the core group of large Tis
- D3.2 Report on the networking and coordination model
- D3.3 Report about the proposed model of collaboration agreement

WP4. INNOVATION

- D4.1 Report on acccelerator market study
- D4.2 Report on SC magnet market study
- D4.3 Report on best practice collaboration between industry and technology

WP5. INDUSTRIALIZATION

- D5.1 Definition of the possible structure and content of a database for materials and components
- D5.2 Final report on the required conditions for apprenticeships program in TI
- D5.3 General harmonised guidelines for the safety of cryogenic equipment
- D5.4 Final report on the required conditions for apprenticeships program in industries
- D5.5 Final report on conditions for developing prototypes in industry

AMICI-background: list of partners and (partial) list of contacts

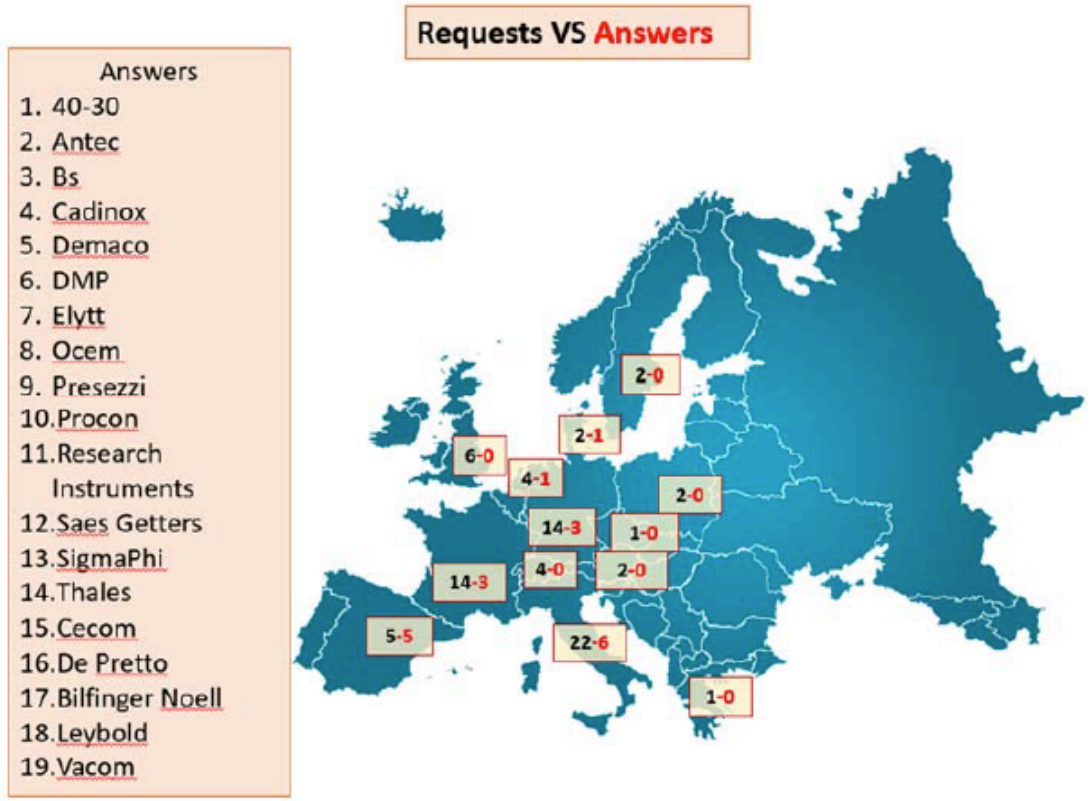


Figure 1: Geographical distribution of IS submissions and received answers. On the left the list of companies who answered

"From a population of 82 contacted companies, the total number of answers was 19 and, within these, not all the questions were answered."

Table 1: List of contacted Industrial Partners

1. 40-30 SAS	29. Demcon Kryoz	57. Oxford Instruments Nanoscience
2. Accelerators and Cryogenic Systems	30. DH Industries B.V.	58. Oxolutia SL
3. ALCA Technology Srl	31. DMP	59. Procon Systems
4. Alphysica	32. ELYTT ENERGY	60. Research Instruments
5. ALSYOM	33. EMPRESARIOS AGRUPADOS	61. Röchling Engineering Plastics SE & Co. KG
6. ANTEC Magnets, S.L.	34. ENSA	62. Rolf Kind GmbH
7. ASG superconductors	35. Esteyco	63. RUAG Space GmbH
8. AVS	36. Ettore Zanon	64. Saes getters
9. Babcock Noell GmbH	37. F.W. Hempel Metalli S.r.l.	65. Salzgitter Mannesmann Stainless Tubes
10. Basis Electronique de Puissance	38. FEAC Engineering P.C.	66. ScandiNova Systems AB
11. Bertin Technologies	39. FMB Feinwerk- und Messtechnik GmbH	67. Scanditronix Magnet
12. Bilfinger Noell GmbH (Babcock)	40. Hempel Special Metals	68. SDMS
13. Bruker	41. Heraeus Deutschland GmbH &amp	69. Siemens
14. Bruno Presezzi S.p.A.	42. IBA proton therapy - worldwide	70. Sigmaphi
15. BTESA	43. ICEoxford Limited	71. SIMIC SPA
16. CADINOX	44. IDOM	72. Stöhr Armaturen GmbH & Co KG
17. CAEN ELS s.r.l.	45. Imbach & Cie	73. STRUMENTI SCIENTIFICI CINEL s.r.l.
18. Can Superconductors	46. Indra	74. Sumitomo (SHI) Cryogenics of Europe GmbH
19. CECOM	47. INTERTEC A/S	75. Tesla Engineering Ltd
20. Colombus Superconductors	48. JEMA	76. Thales
21. Cryogenic Limited	49. Kryosystem	77. THEVA Dünnschichttechnik GmbH
22. Cryoworld B.V.	50. Leybold Italia S.r.l.	78. TTI
23. CSC S.P.A.	51. LOT Quantum Design	79. Vacuum-projects
24. CST-Computer Simulation Technology AG	52. MECACHROME	80. VACOM GmbH
25. Danfysik	53. Metrolab Technology SA	81. Walter Tosto S.p.A
26. DB ELETTRONICA TELECOMUNICAZIONI	54. Nortemecanica	82. Weka AG
27. De Pretto Industrie S.r.l.	55. OCEM Power Electronics	
28. DEMACO HOLLAND bv.	56. OSWALD Elektromotoren GmbH	

AMICI survey approach and next steps: some highlights

Istituto Nazionale di Fisica Nucleare

PART 1 – INDUSTRY GENERAL INFORMATION

1) **First, Last Name and function (of the person answering the survey)**
2) **Name of the Company**: *free answer*
3) **Company Commercial Operating Field**: *multiple choice answer*
   - Accelerating Structures-Normal Conducting
   - Accelerating Structures-Super Conducting
   - Waveguides and waveguides Components
   - High Power Systems (Klystrons, Modulators, Inductive Output Tubes,…)
   - Vacuum Chambers
   - Pumping Systems (Ion Pumps, Turbo-molecular,…)
   - Diagnostics
   - Normal Conducting Magnets
   - Super Conducting Magnets
   - Magnets Power Supplies
   - Cryogenic systems
   - Other specialized mechanical components for accelerators
   - Other specialized mechanical components for magnets
   - Electronics and instrumentation for accelerators
   - Electronics and instrumentation for magnets
   - Other
4) **Other details on Company Operating Fields**: *free answer*
5) **What is the annual company % of turnover relative to the field of accelerator technology?** *multiple choice answer*
   - 0-10%
   - 10-40%
   - 40-70%
   - Over 70%
6) **What is the annual company % of turnover relative to the field of magnet technology?**
   - 0-10%
   - 10-40%
   - 40-70%
   - Over 70%
8) **What type of commercial products have you developed in collaboration with Institute?**
   - Research Equipment
   - Medical products (e.g. diagnostics systems, etc…)
   - National security (e.g. X-ray scan systems)
   - Material treatment (e.g. sterilization,…)
   - Other: please specify
9) **Did the collaboration have the possibility to support qualified personnel like Ph. D students, temporary contract researcher, technician, interns? If so, please indicate who paid for them?** *Multiple Choice Answer*
   - The company
   - The RL
   - A co-financing programme
10) **Other comments on the social impact of Collaboration (e.g. after the collaboration the qualified personnel has been hired by the Industry, etc…)** *free answer*
11) **In the framework of the collaboration, were there some training/education from the Institute to Industry personnel?** *Multiple Choice Answer*
    - Yes
    - No
12) **Has the training/education from the Institute to Industry personnel been useful?** *linear scale answer*
    - Not useful(1)->Useful(5)

a. **(*riprendere survey dei contatti visto che molte aziende non hanno risposto*)**;

b. **Avviamo una sorta di "call/sondaggio" tra i contatti di "INFN-Acceleratori-all"**, vi chiederemo di indicarci ulteriori aziende, se non già contemplate nella lista di AMICI, fornendoci alcuni dettagli: area di expertise, possibili contatti, ecc.;

c. Sulla base di questa raccolta di dati cominciamo a strutturare il livello "aziende" nella nostra mappatura, a sistema se possibile con le varie reti che individueremo.