Human Resources of SuperKEKB, LHC and ILC

T. Tauchi, KEK

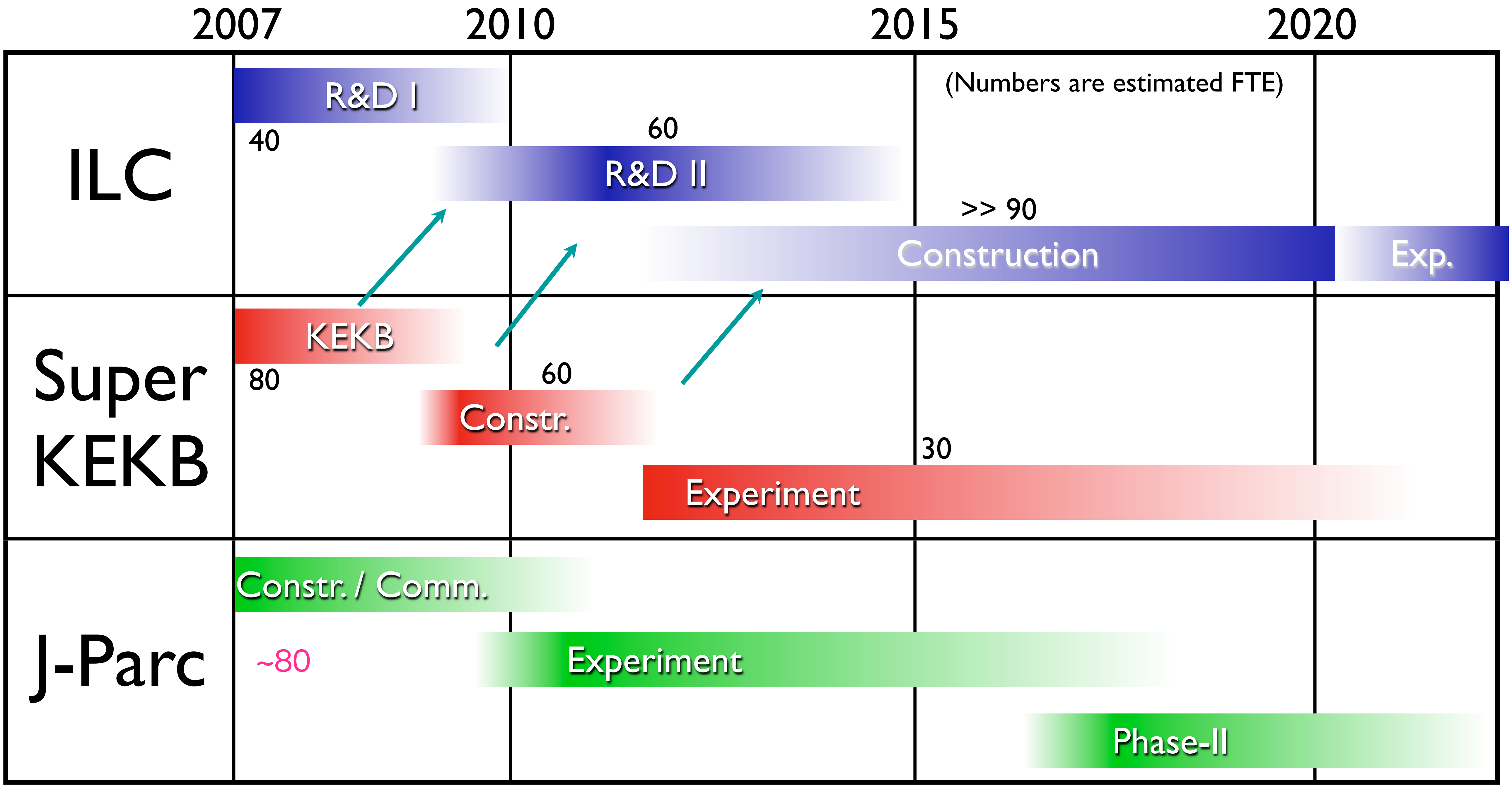
宇宙の創成・進化の謎の究明
国際リニアコライダー（ILC）
物質と力の究極像の探究
KEK-Roadmap
ニュートリノの
CP非対称の検証
小林・益川理論を超える
クォーク理論の探求
研究成果・技術開発・人材育成
J-PARC/T2Kの増強
Super-KEKB
J-PARC
KEK-B
LHC
クォークの
CP非対称の検証
レプトン
クォーク
「物質の源」
ニュートリノ
の謎の探求
6つのクォークの探求
「力の源」
ヒッグス粒子「質量の源」

KEK-Roadmap 2013

３．４ ILC

高エネルギー物理学はハドロンコライダーとレプトンコライダーを両輪として飛躍的な発展を遂げてきた。ILCは、LHCにおけるヒッグスと考えられる新粒子の発見および今後期待される発見に基づき、重心系500 GeV程度のエネルギー領域において、それらの新粒子・新現象についてレプトンコライダーの特長を活かした明解かつ精密な測定を行う。これにより、電弱ゲージ対称性の破れのメカニズムの理解を深め、背後にある新しい物理法則の解明を進めて、素粒子物理学を新たな段階へと飛躍させる。日本はILCの加速器および測定器の研究開発において既に重要な役割を果たしており、今後ILCの実現を図るための活動を一層強化することが求められる。KEKは、ILC国際共同設計チーム（ILC-GDE）との連携によって、ILC実現にむけた超伝導加速空洞および加速器関連技術開発を着実に推進するとともに、2012年には、必要な技術・予算・人員・建設期間を含む設計検討結果を、ILC技術設計書として完成させ、LHCでの新粒子発見に基づいた適切なエネルギー領域での加速器建設に向けた具体的な準備を進めている。LHC実験との相乗効果による物理成果を最大限に引き出すべく2020年代中のILC稼働を目標とする。KEKが中心となって、日本がホストするILC計画推進のための国際準備組織を立ち上げ、装置、施設・設備、研究所組織の詳細設計などに取り組み、本ロードマップ期間内（2014年からの5年間）の国際協力の枠組みによる建設着手を目指す。

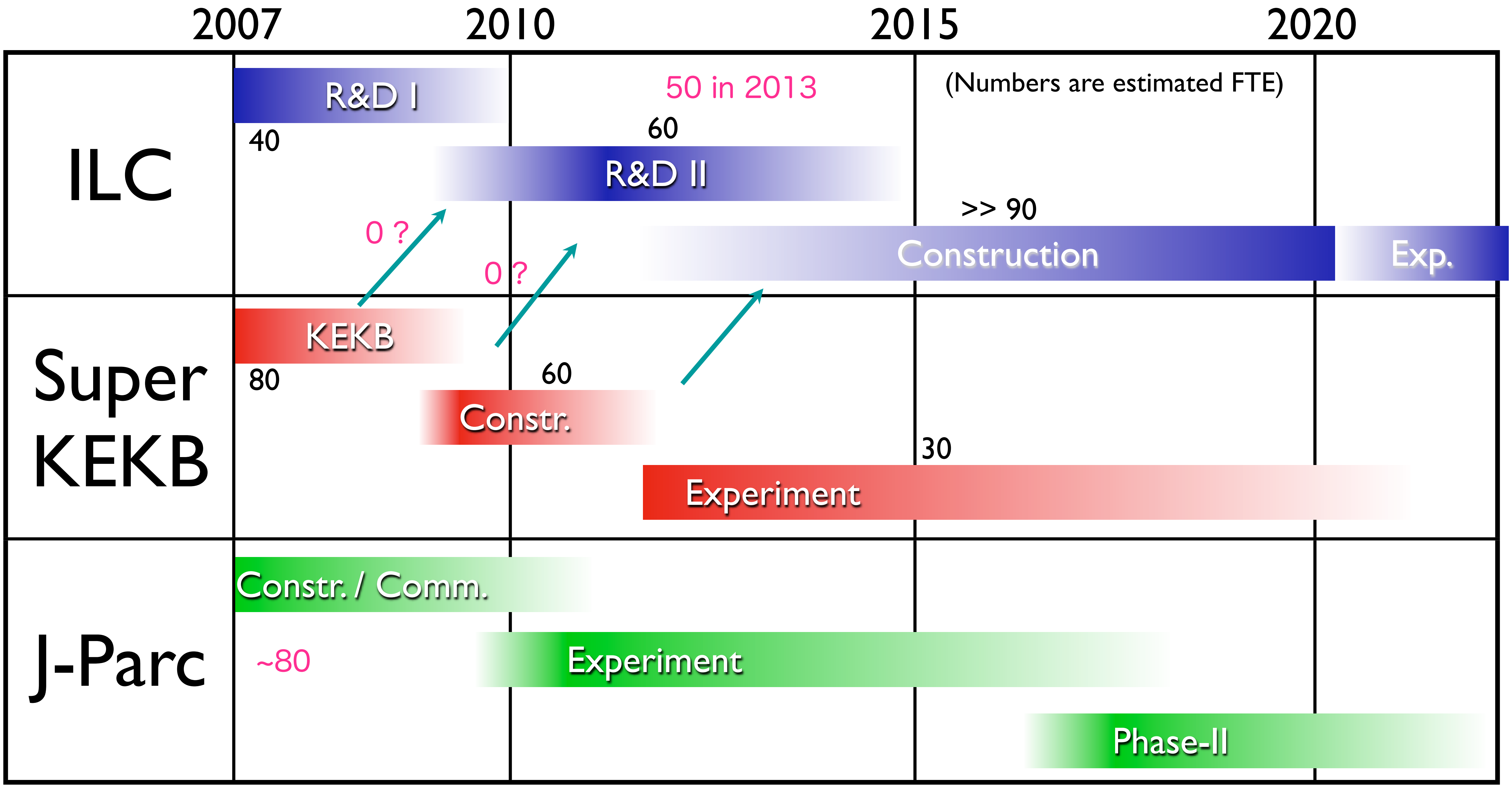
We will do everything: ILC, SuperKEKB, J-Parc.



- **All members of KEK-ACCL will have both duties for ILC and SuperKEKB.**
- **The weight between SuperKEKB and ILC is subject to change, depending on the readiness of ILC.**
- **The individual role and weight in the two projects should be flexibly managed by considering time, speciality, and occasion.**

Ref: Utilization of KEKB for ILC R&D, Y. Suetsugu on behalf of K.Oide and KEKB staff, KEK, 2006.09.27 at ILCDR2006

We will do everything: ILC, SuperKEKB, J-Parc.



- In the 2010s decade, while producing physics by SuperKEKB, utilize KEKB accelerator's material and human resources to the R&D of ILC.
- Upgrade KEKB to SuperKEKB, and do experiment.
- R&D of ILC for industrization and construction.

Ref: Utilization of KEKB for ILC R&D, Y. Suetsugu on behalf of K.Oide and KEKB staff, KEK, 2006.09.27 at ILCDR2006

Grand Lepton Collider Project

- GLC-I (2009-2014):
  - SuperKEKB Construction / Experiment
  - ILC R&D
- GLC-II (2014-2024):
  - ILC Construction / Experiment
  - SuperKEKB Experiment
  - Future R&D (CLIC, Muon)
- GLC-III (2024-2034):
  - ILC Experiment / Upgrade
  - Muon Factory / Collider
  - SuperKEKτ
  - Far future R&D

Ref: Utilization of KEKB for ILC R&D, Y. Suetsugu on behalf of K.Oide and KEKB staff, KEK, 2006.09.27 at ILCDR2006

SuperKEKB

Human Resources

If no persons are added (with present staff only), about 30 FTE would be short for construction.

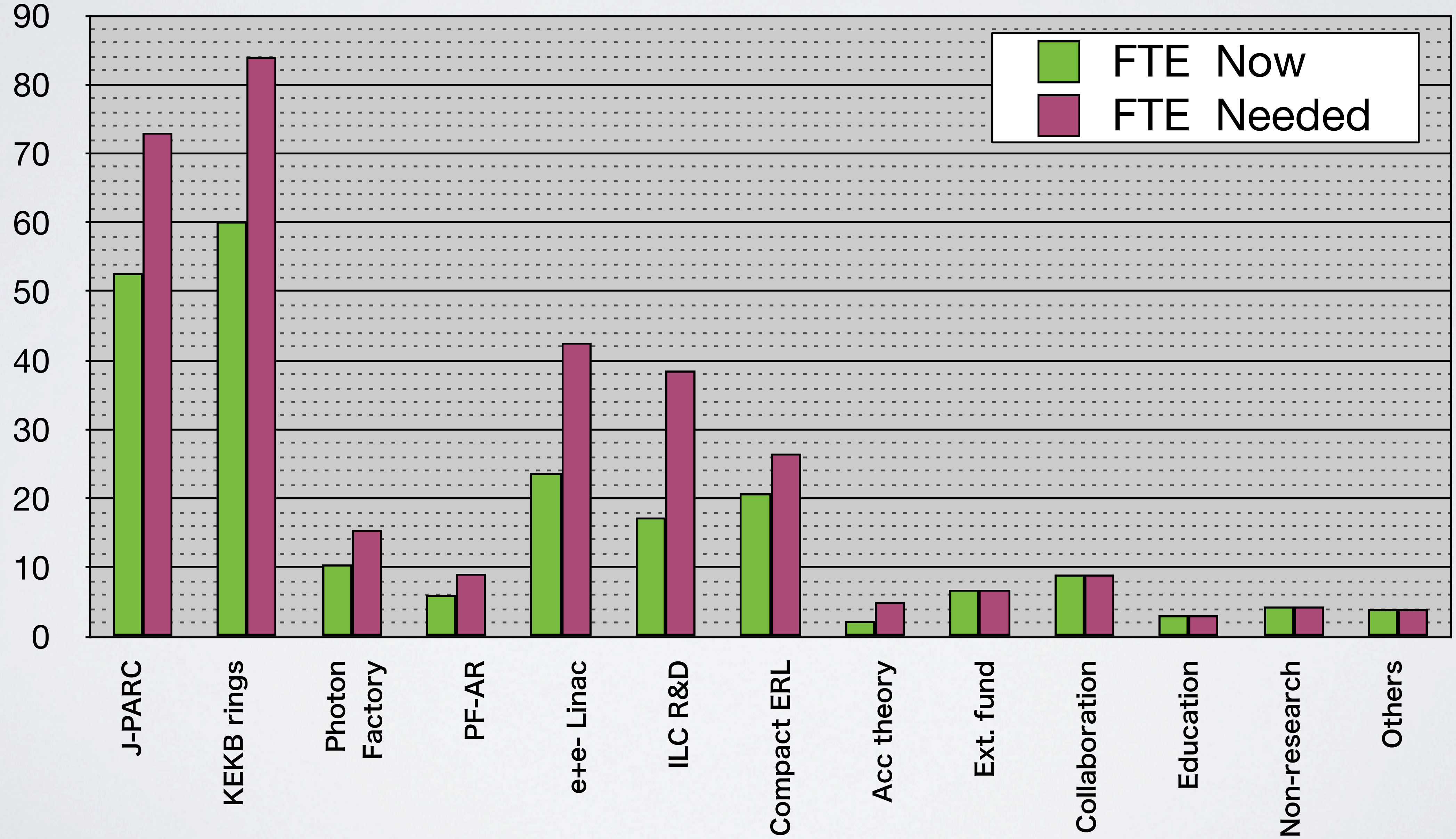
Date	Status	FTE needed (A)	FTE available (B)	Reason for (B)	FTE short (A) - (B)
Feb. 2010 (present)	before construction		57.4		
Apr. 2013	under construction	81.5	47.9	9.5 to be retired	33.6
Apr. 2015	1 year after commissioning	70.0	39.9	17.5 to be retired	30.1

- About this table
  - Needed FTE is estimated based on the number of working staff during KEKB construction.
  - The HR for the Linac is not included in the list. ~50
  - Similar estimates were done in the Accelerator Laboratory. The result shows 78 FTE short in total (107 short as of Apr. 2013) if all projects written in the KEK roadmap be persued at the same time.
- How to fill the short FTE?
  - New persons? (usually only a few persons are newly hired each year in the whole Accelerator Laboratory.)
  - What we can do in the Accelerator Laboratory is being discussed.
  - Will priority among many projects in KEK be clearly defined?

Risks in human resources(3)

・KEK has only about 300 accelerator scientists and engineers, which are 30% of staffs required for the ILC construction, even if all other projects are sacrificed.

・No concrete plan has been proposed to gather from abroad.



Total: Now 220・Needed 321

Risks in J-ILC (ILC hosted by Japan), K.Oide, 2013.07.20

SuperKEKB

Cost estimation

1 (Oku-Yen) = 1.1 M USD = 0.8 M EUR (as of 12 Feb, 2010)

Components	Cost (Oku-Yen)	Remarks
Linac upgrade and Damping Ring	31	e+ matching and L-band acc., RF-gun and laser system, Damping Ring components
Vacuum System	135	beam pipes (ante-chambers, electrodes, etc), pumps and other vacuum components for 3km x 2 rings
Magnet System	93	magnets, power supplies, cables
IR upgrade	20	QCS and other hardware
RF System	25	add 9 RF stations, improve cavities (coupler, HOM damper)
Beam monitor and control	32	BPM, SRM, feedback, control system, etc.
Belle upgrade	14.7	
Total	350.7	

- Cost for DR tunnel construction is not included in the list. Also cost for buildings and facilities for Linac, DR and MR is not included. These costs are about 30 Oku-Yen in total.
- This list is what went to MEXT last year. According to recent estimation, cost for some components increases, but some others decrease.

TRISTAN

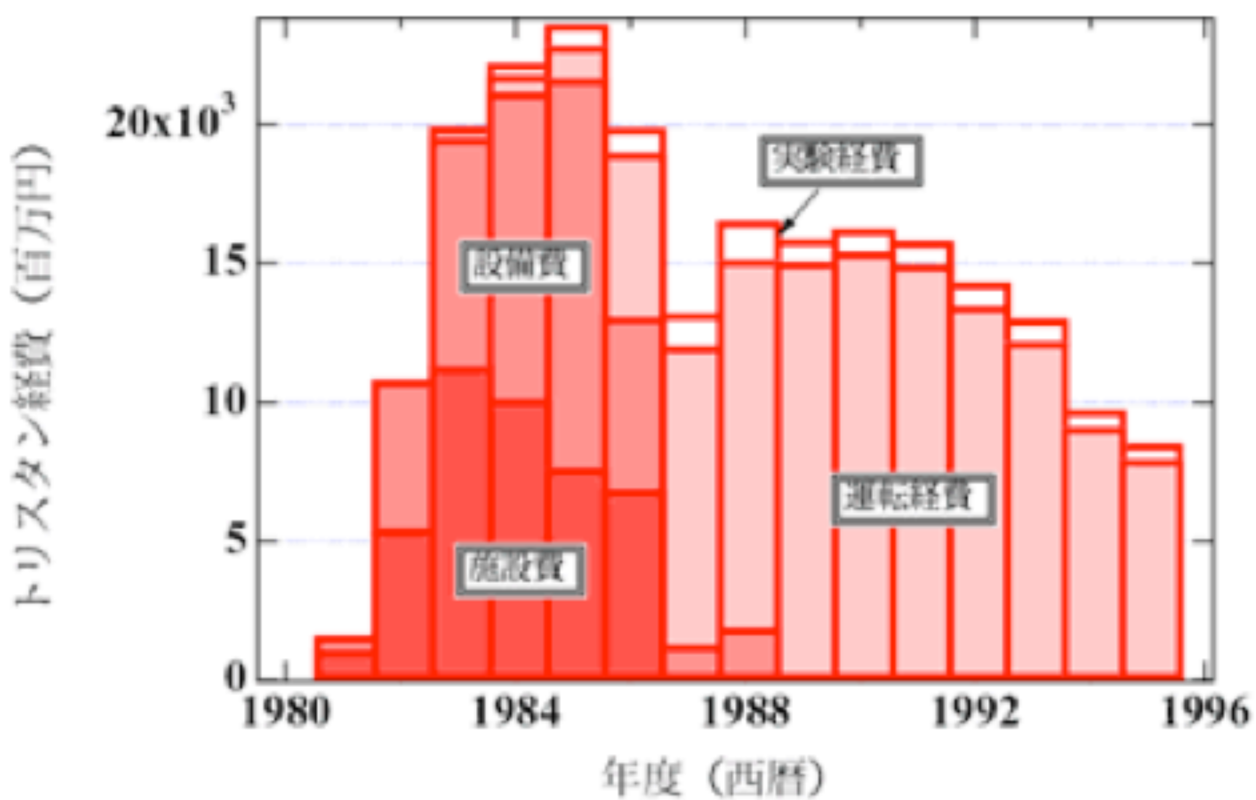


Figure 15: トリスタン施設の整備及び運営状況の推移

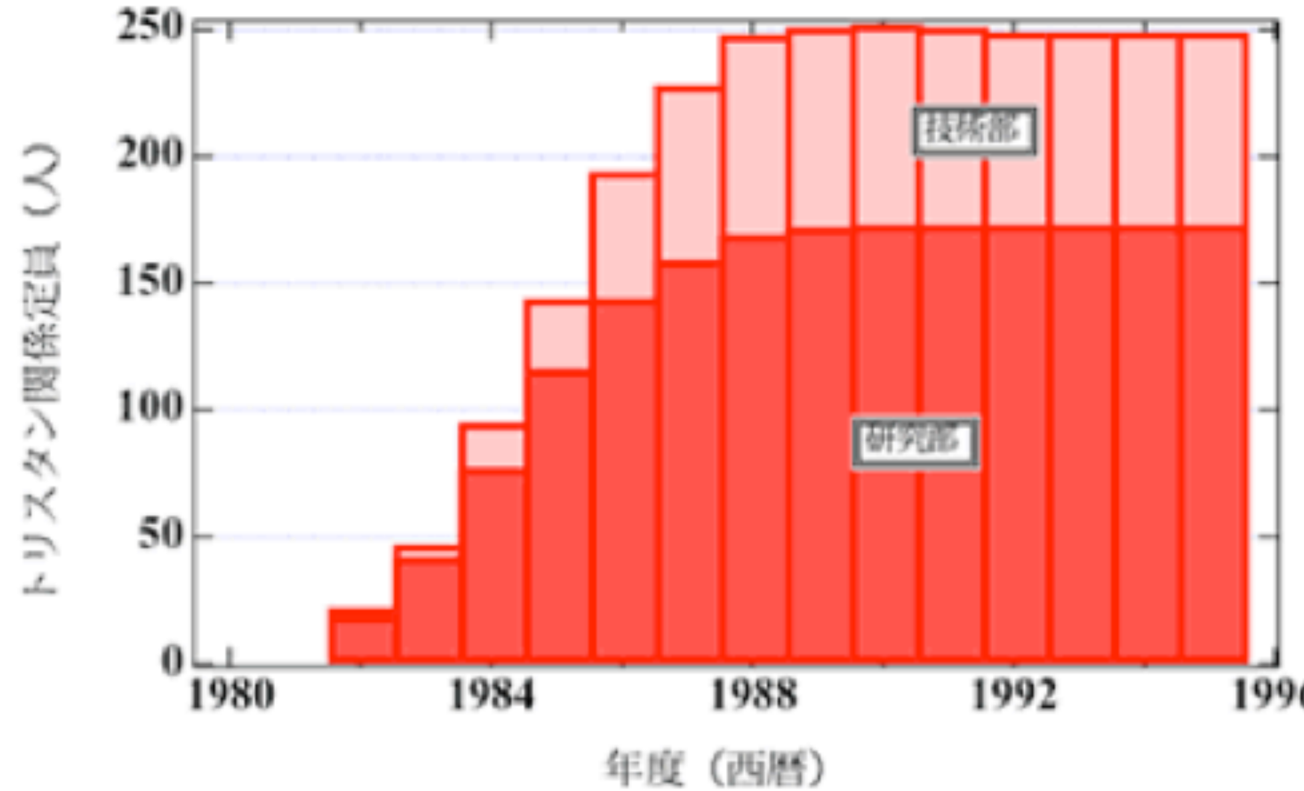


Figure 16: トリスタン関係定員の整備状況

トリスタン計画報告書、1996年9月、http://legacy.kek.jp/hyouka/TRISTANreport/index.html

SPring8/SACLA

平成25年4月現在で、SPring-8（周長約1.4km）とSACLA（全長約0.7km, 建設:2006-2011.3）を併せておよそ500名の職員が働いています。各施設が稼働している期間中は、職員の他に毎日250人ほどの利用者（ユーザー）が実験しています。 当初の建設費は約1,100億円です。用地は兵庫県が提供しました。 平成25年度のSPring-8およびSACLAの施設運転・維持管理等に係る予算はそれぞれおよそ74億円および49億円、また利用者選定・利用支援等に係る予算は、およそ14億円です。なお、後者の利用者選定・利用支援等に必要な予算はSPring-8とSACLA、両方の利用促進に使用されます。(http://www.spring8.or.jp/ja/about_us/whats_sp8/faq/)

ILC-TDR

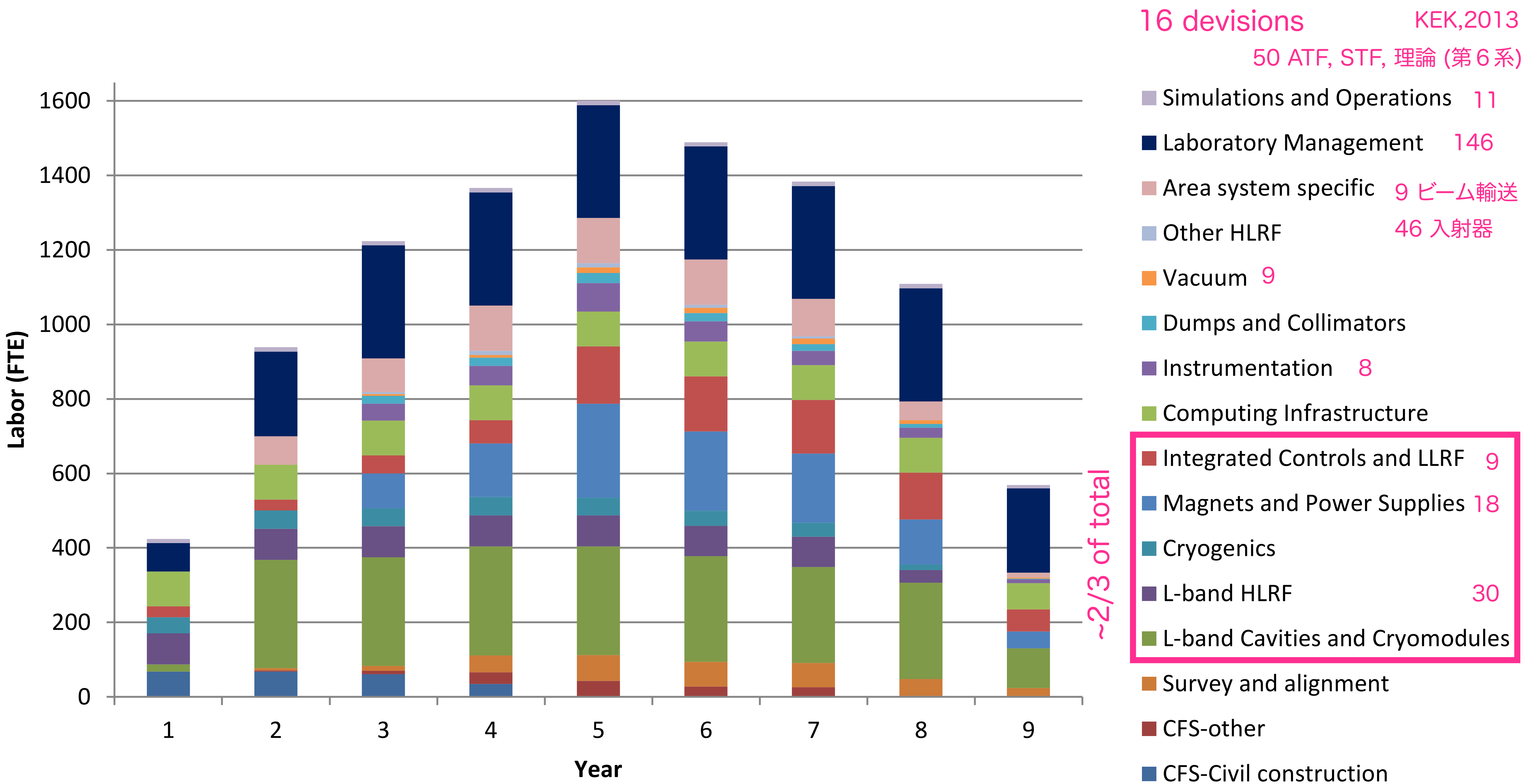


Figure 15.14. Profile for explicit Labour (excluding installation) vs. project year, broken down by technical system.

the total Labour estimate is 22.6 million person-hours, i.e. 13,294 person-years , including the labor for the installation of 5.4 million person-hours (3,180 person-years).

the Labour estimate for operations is 850 FTE, with a premium of about 25%.

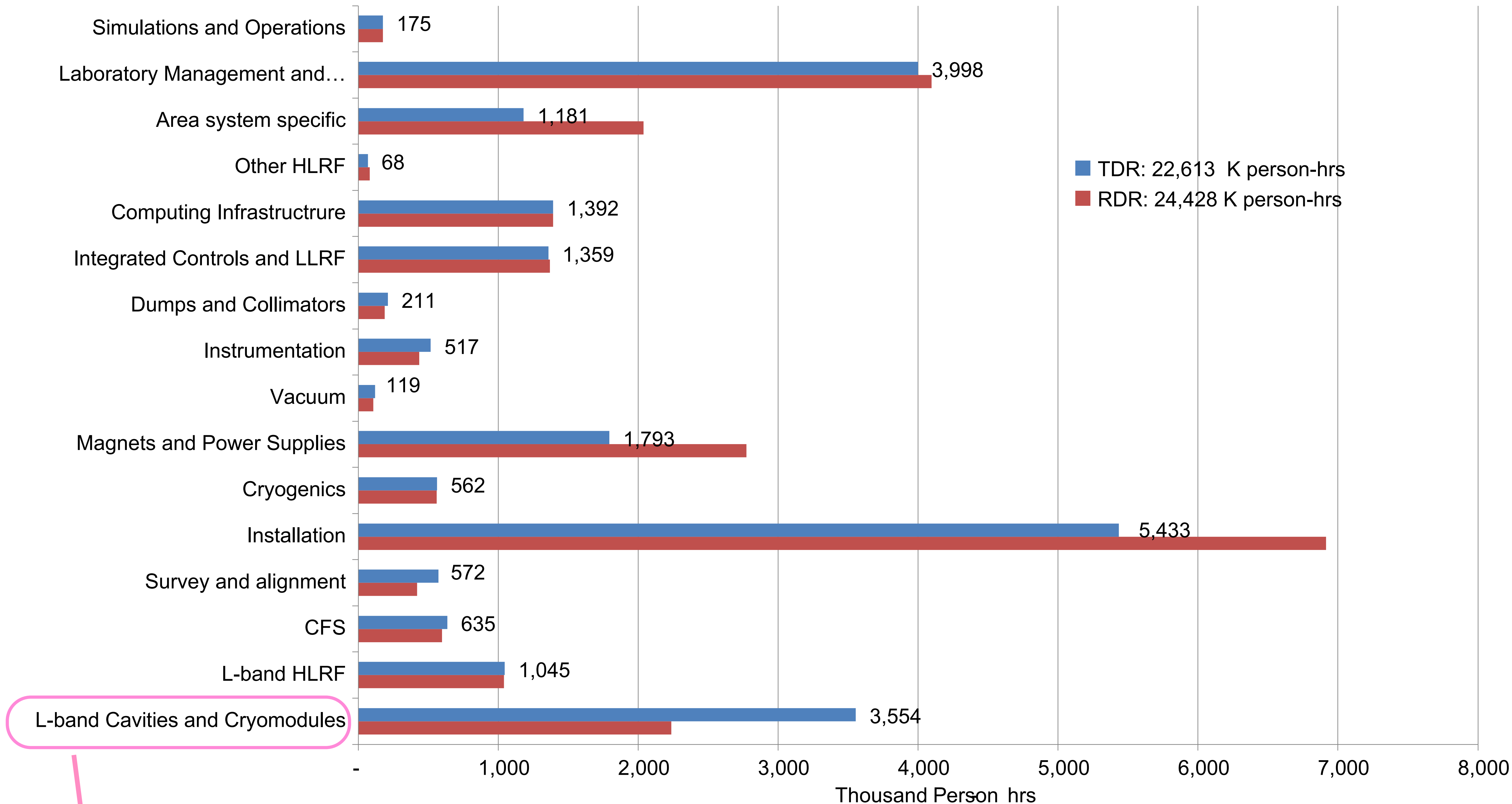


Figure 15.9. Explicit Labour, which may be supplied by collaborating laboratories or institutions, listed by technical system, and some Accelerator-specific systems. The numbers give the TDR estimate for each system in thousand person-hours. Also shown for comparison is the RDR.

Cavity qualification, testing and Quality assurance for the cavities and quadrupoles, and high-power processing of the couplers (FNAL study), Coupler processing(EXFEL), cryomodule EDIA (Engineering, Design, Inspection and Acceptance (EDIA), final engineering design, sustaining engineering, Cryomodule qualification (EXFEL), cryomodile hardware commissioning in the tunnel,

ILC-TDR installation

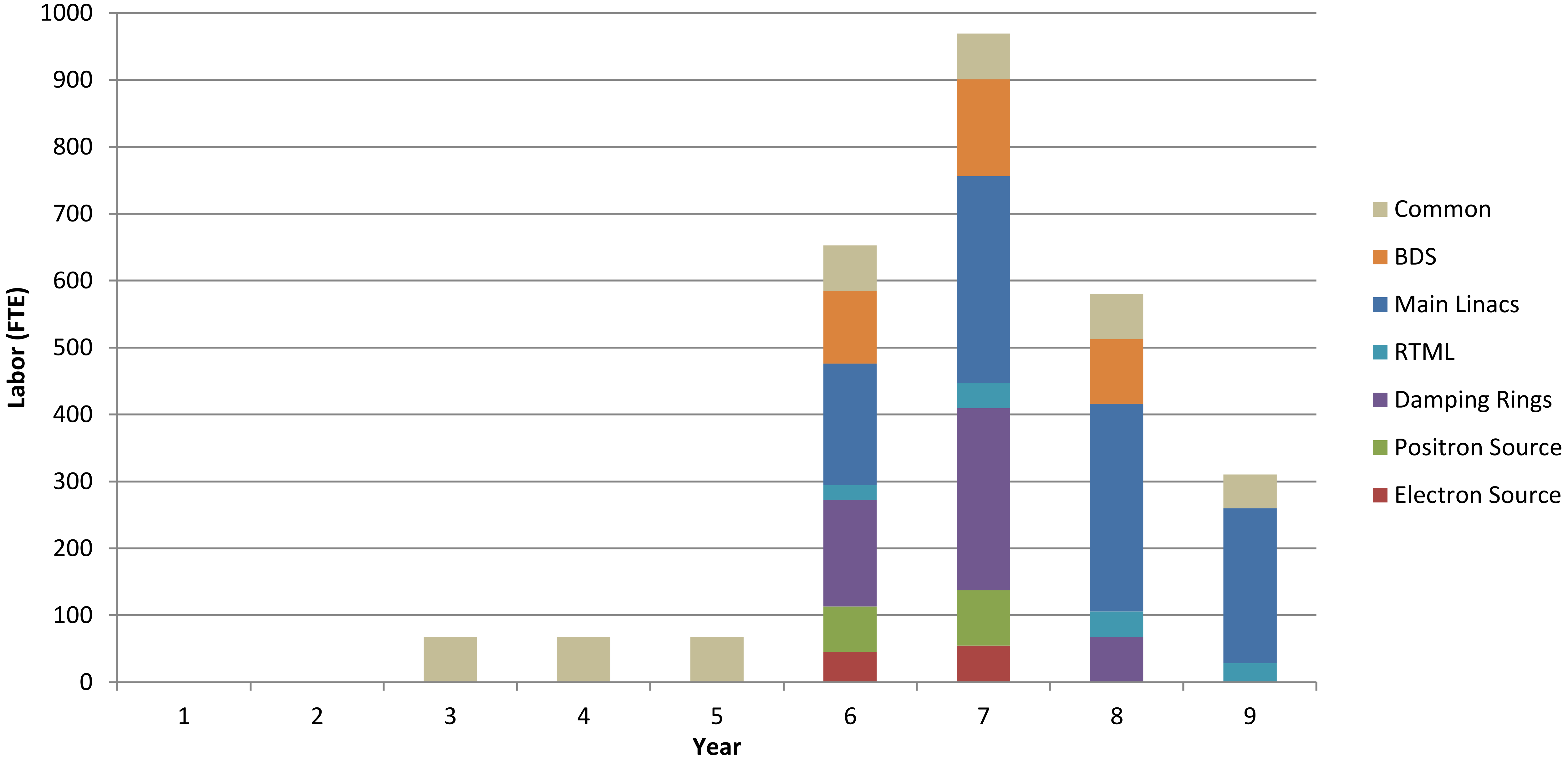


Figure 15.15. Profile for explicit installation Labour vs. project year

the total Labour estimate is 22.6 million person-hours, i.e. 13,294 person-years , including the labor for the installation of 5.4 million person-hours (3,180 person-years).

the Labour estimate for operations is 850 FTE, with a premium of about 25%.

ILC-TDR Value estimation

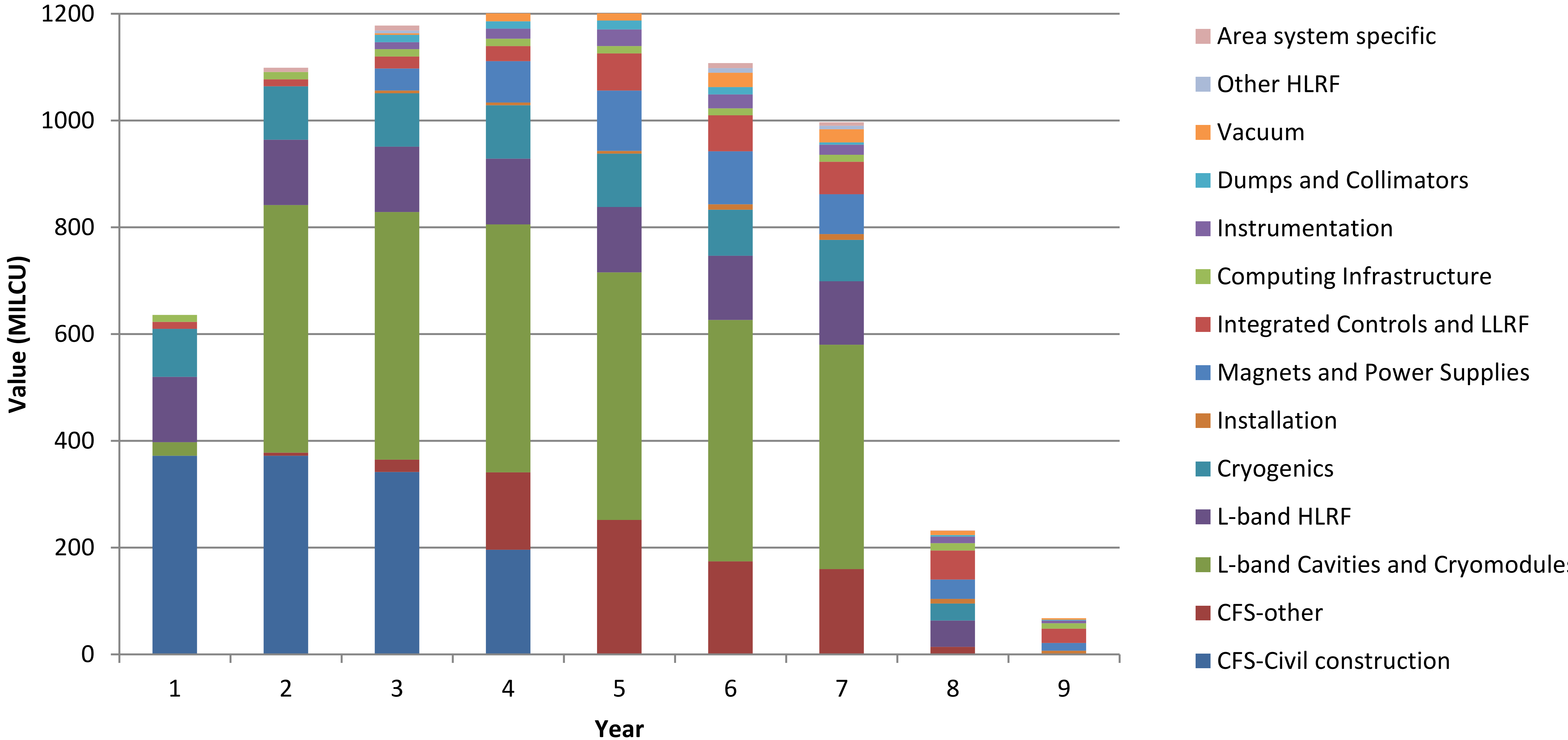


Figure 15.13. Value profile vs. project year. broken down by technical system.

Average over three regions : total value estimation = 7.8 billion ILCU

3.12. Personnel policy: There are two main options for the personnel policy for an ILC laboratory, the pros and cons of which are outlined below:

ILC-PIP

3.12.1. Seconded personnel from participating institutions

Benefits: Employment benefits, social security, pension plans and re-employment of the seconded personnel would be dealt with by the participating organizations that provide those seconded personnel to the central ILC organization, which, in turn, would be freed from such duties. Participating organizations would be allowed to develop their own long-term human resource plans with the seconded personnel in the ILC organization as part of their resource pool. If managed adequately, this should contribute to securing mobility of experts between the branches at the ILC site and the member organizations.

Issues: A member of the central team would come under dual command chains, one being the central team itself and the other the member-lab to which he or she belongs. Seconded personnel could experience difficulties in receiving fair personal reviews by their home institutions since they will inevitably become divorced and out of touch with the home laboratory as their research priorities substantially change over time.

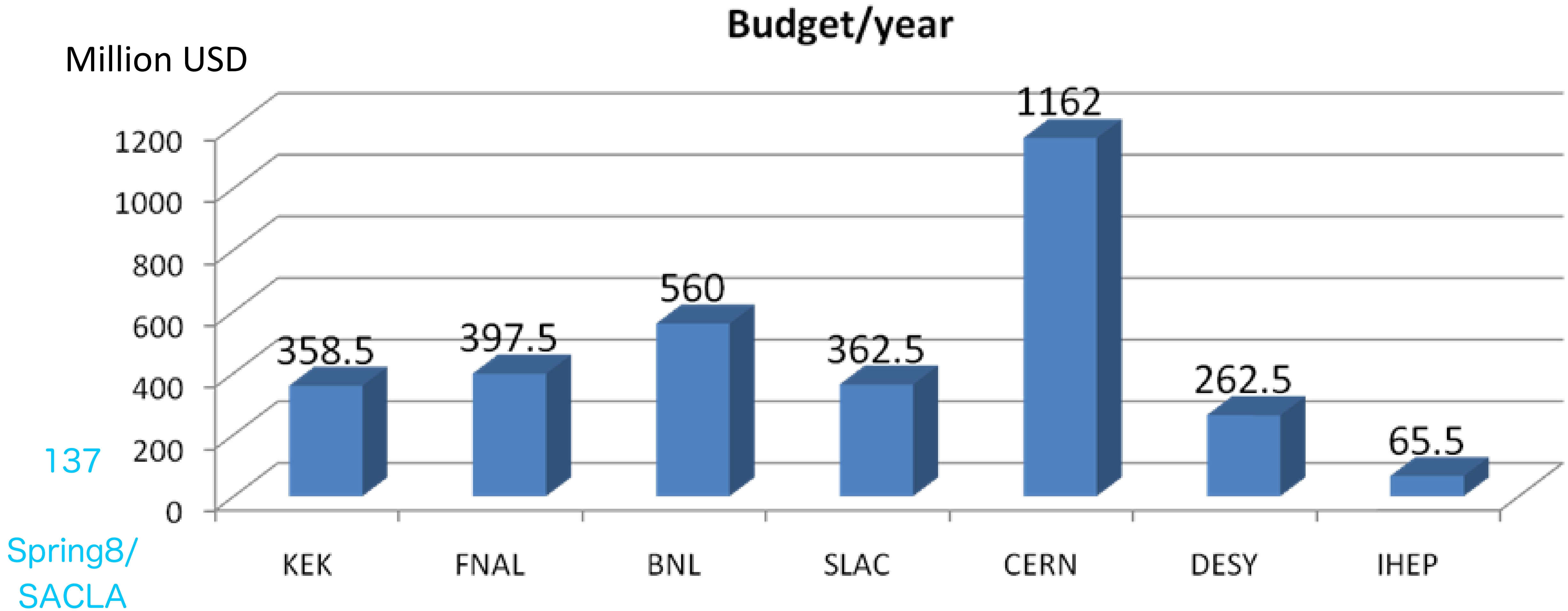
3.12.2. Direct employment

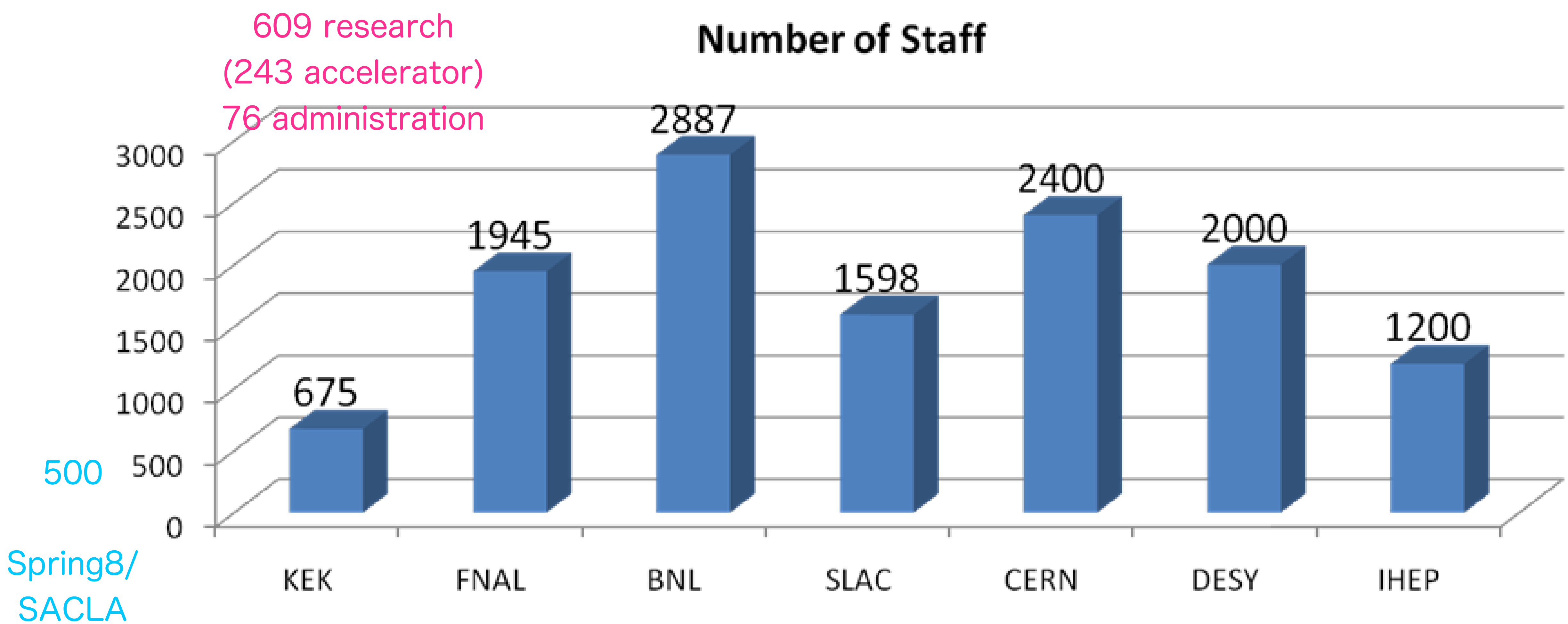
Benefits: Providing an adequate budget is secured, this would enable a stable supply of human resources during the project lifecycle. Formation of a strong and stable central team under a straightforward and simple management chain could be realized.

Issues: The central ILC organization will have to develop and operate an adequate pension plan. An imbalance in the expert population could result. For instance, the number of experts at participating organizations could be depleted during the project construction phase. Likewise, there could be an expert surplus in the job market as the project nears completion and shutdown.

The ILC laboratory is a fixed-term organization whose lifetime is highly likely to be shorter than careers of many of its staff. It is therefore natural to recommend a personnel policy that is predominantly based on seconding staff from participating institutions. The exceptions would be the Director and his/her senior staff, who would be employed directly.

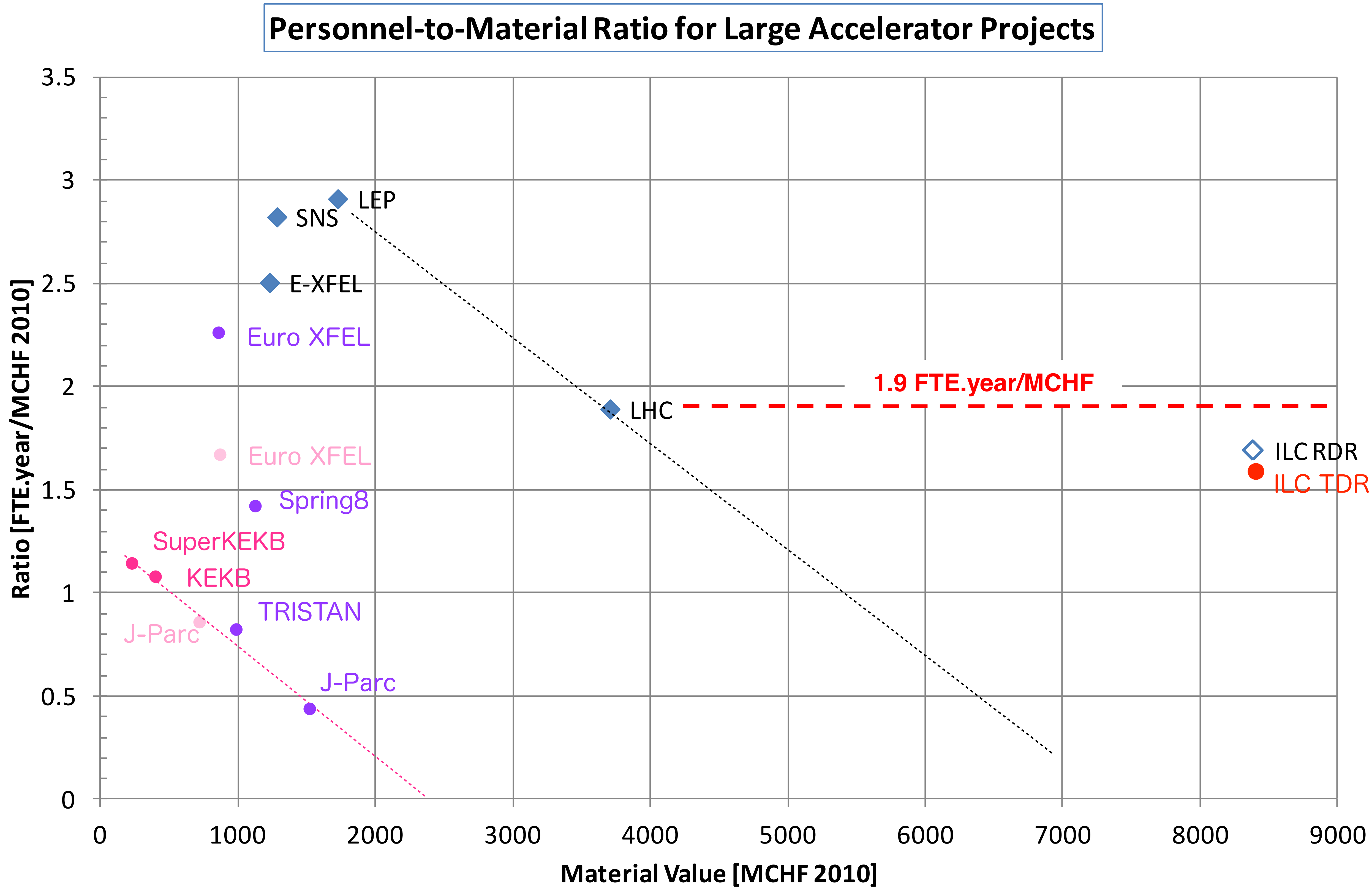
from KEK Project Roadmap, February 28, 2011





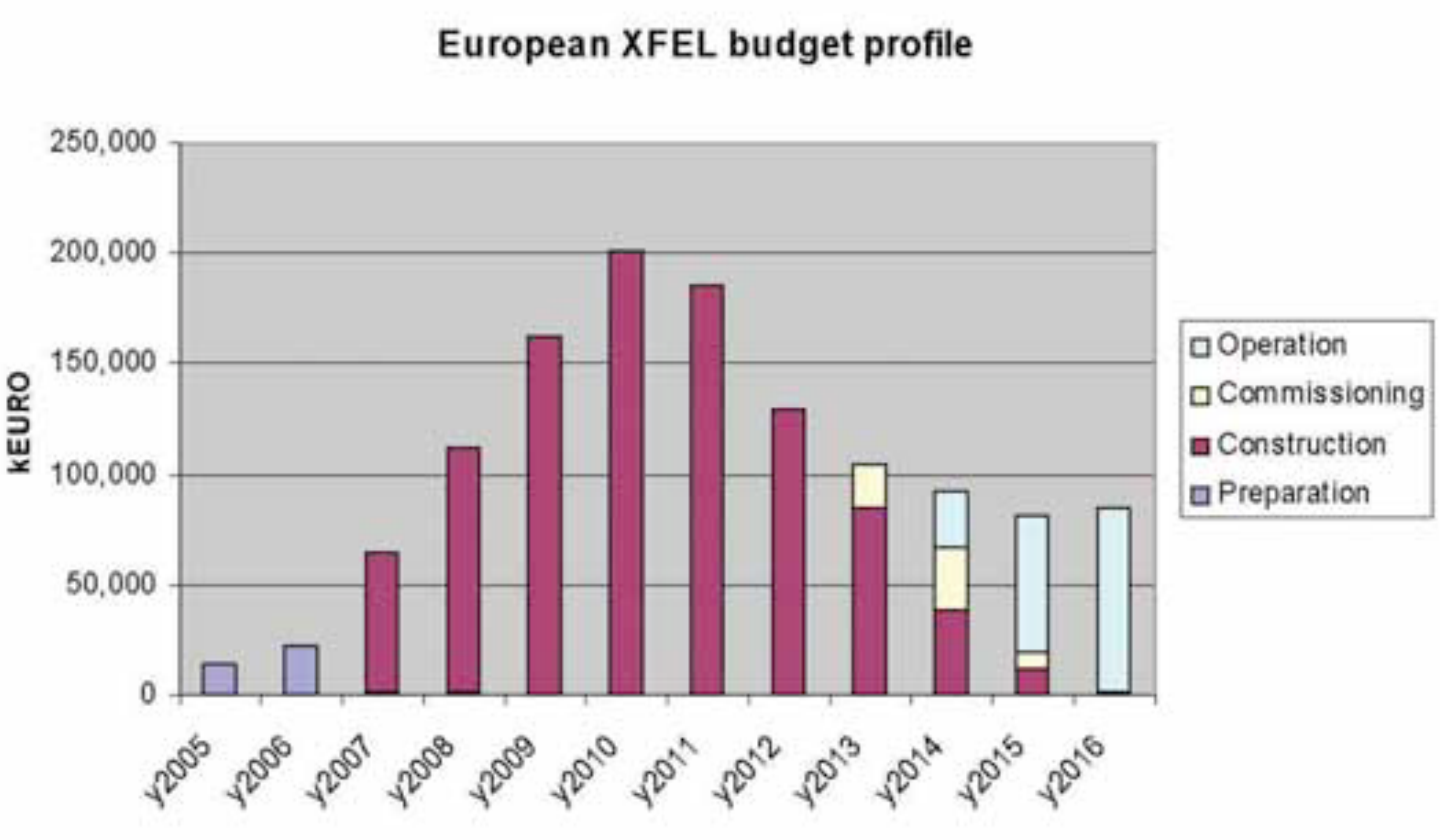
1 swiss franc= 0.81 euro

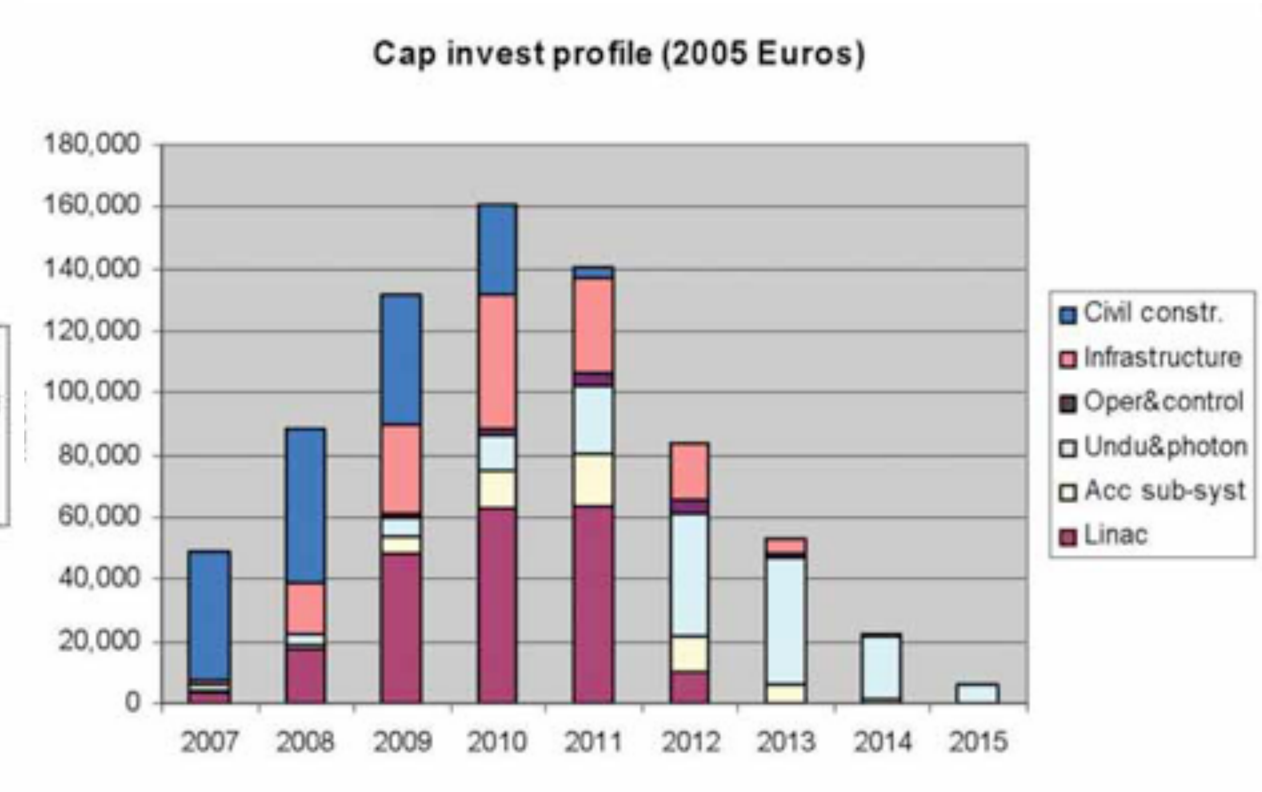
1 swiss franc= 1.07 dollars

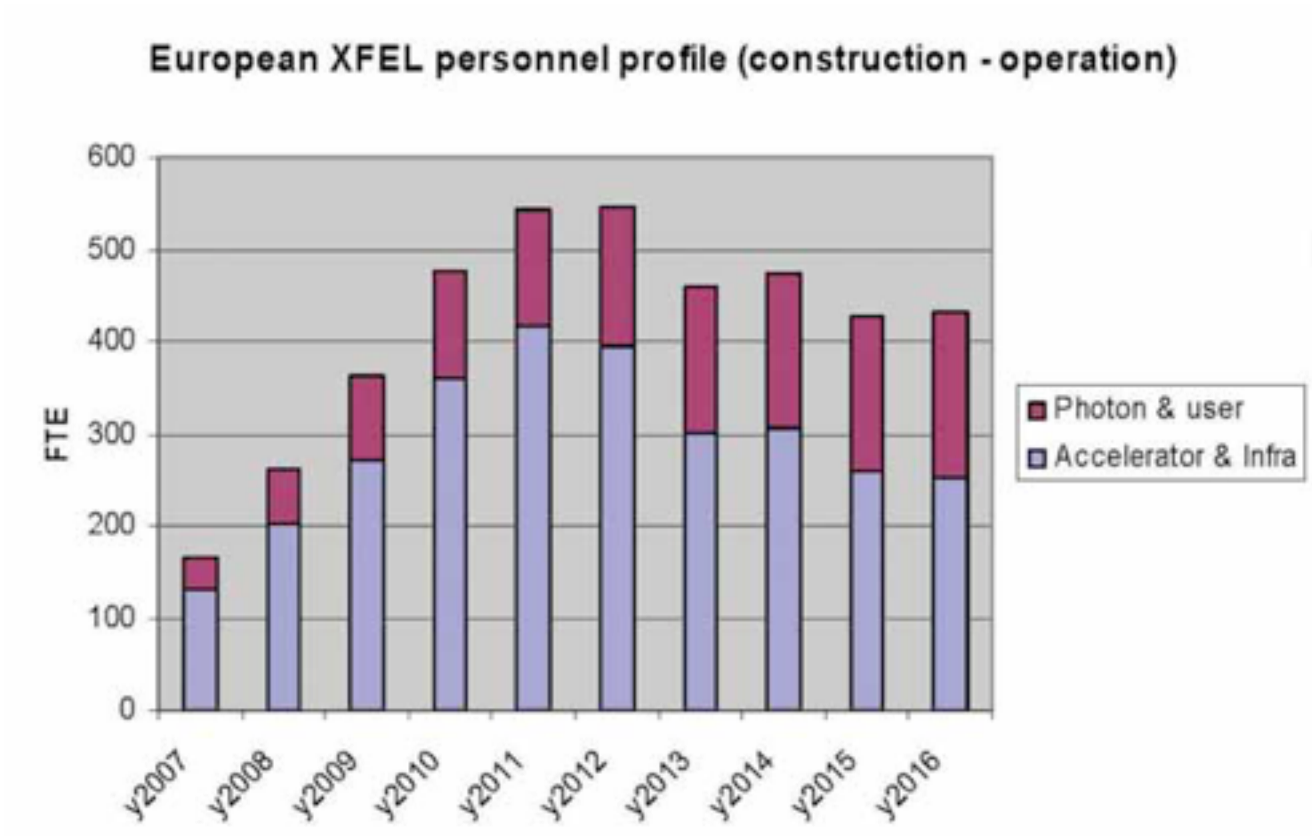


Oide's numbers, ours

Philippe Lebrun, LCWS 12, Univ. of Texas, Arlington, USA





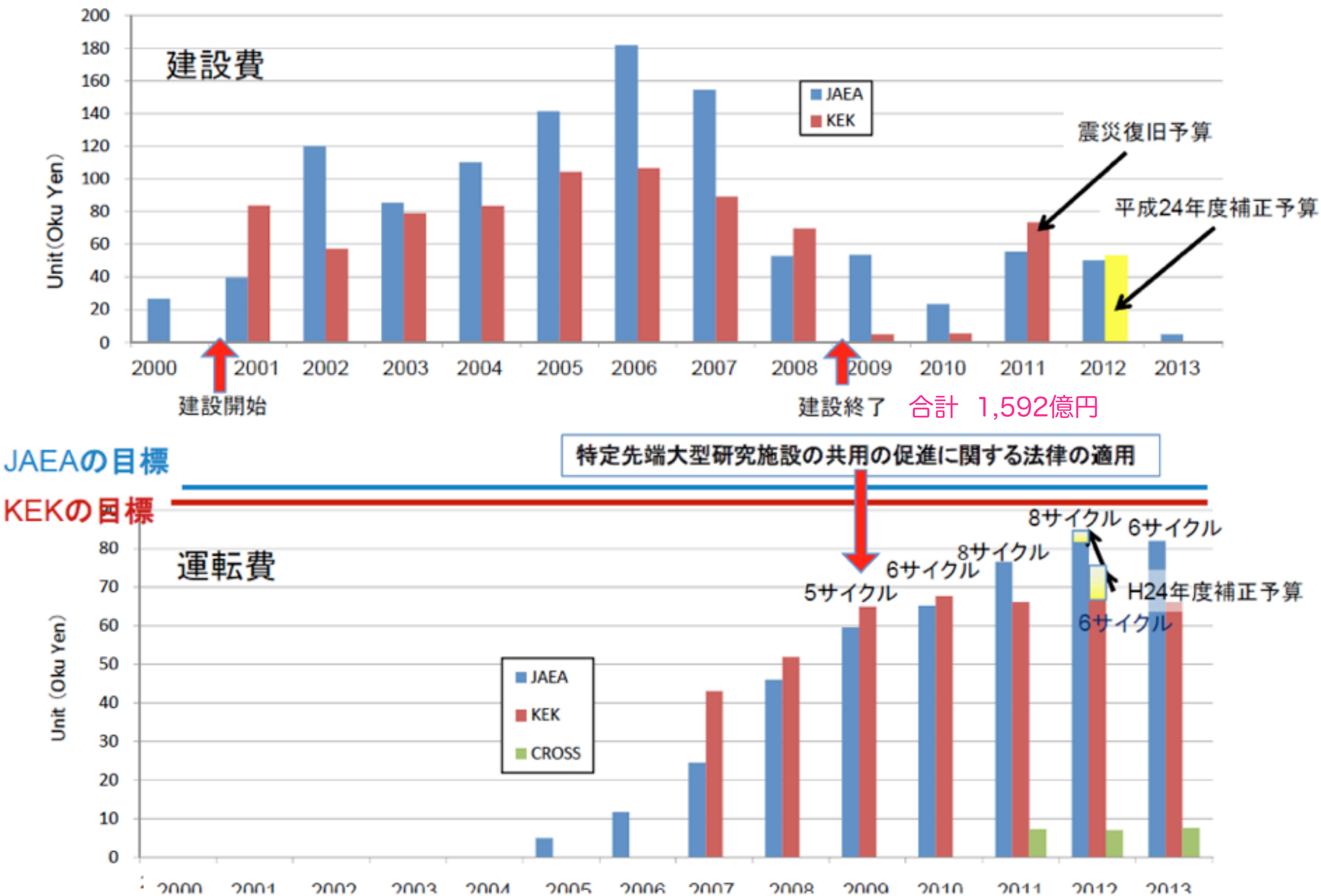


Construction cost in year 2005 prices:

986 M€ (736 M€ capital investment, 250 M€ personnel incl. overhead)

Yearly operation cost: 83 M€ (incl. e.g. user support)

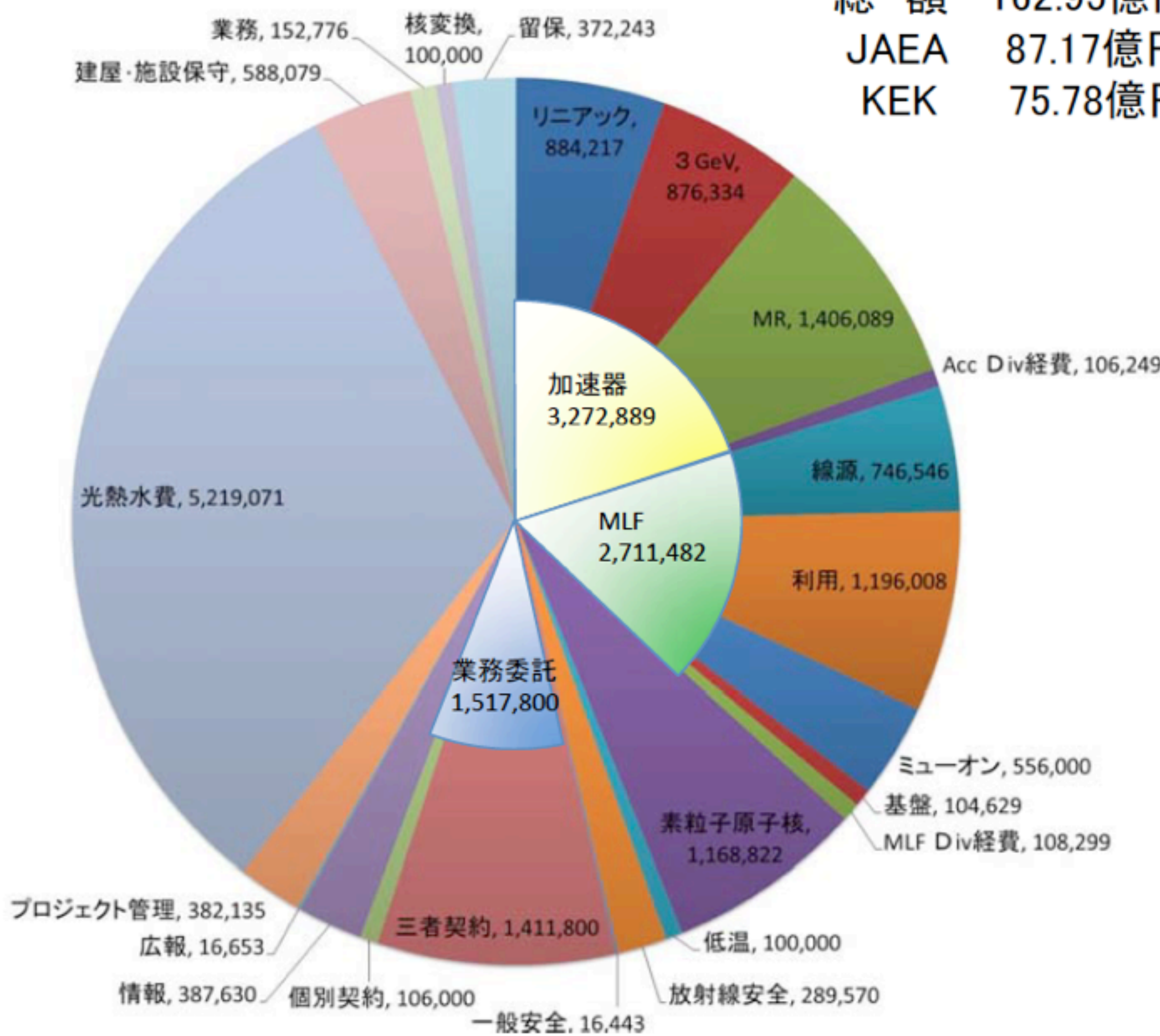
J-PARC予算の推移



J-PARCの概況, 有識者会議資料、 2013.6.21

J-PARCセンター平成25年度予算概要

総　額　162.95億円
JAEA　87.17億円
KEK　75.78億円



J-PARCの概況, 有識者会議資料、 2013.6.21

KEKにおけるJ-PARC関連業務従事職員数及びJ-PARCセンター勤務者数

（平成19年4月1日現在）

研究所・施設等名	KEK 職員数	J-PARC関連 業務従事者数	J-PARCセンター 勤務者数
素粒子原子核研究所	150	76【64】	76【64】
物質構造科学研究所	98	20【20】	20【14】
加速器研究施設	188	81【71】	36【36】
共通基盤研究施設	77	35【16】	7【 6】
大強度陽子加速器計画推進部	15	15【15】	14【13】
管理局【東海管理課】（東海キャンパス安全衛生推進室を含む）	12	12【12】	12【12】
その他（東海管理課以外の管理局等）	148	―	10【 3】
計	688	239【198】	175【148】

（注） 1.【　】内は、専任率を乗じたマンパワー換算数
2.「J-PARC関連業務従事者数」及び「J-PARCセンター勤務者数」は平成19年4月1日現在の数字であり、今後、J-PARCの進展によって増員が見込まれる。
3. 今後は、J-PARCにおける加速器への関与について一層の充実を図ることとしている。

J－PARC評価作業部会（第6回）資料1, 鈴木機構長, 2007 (H19)

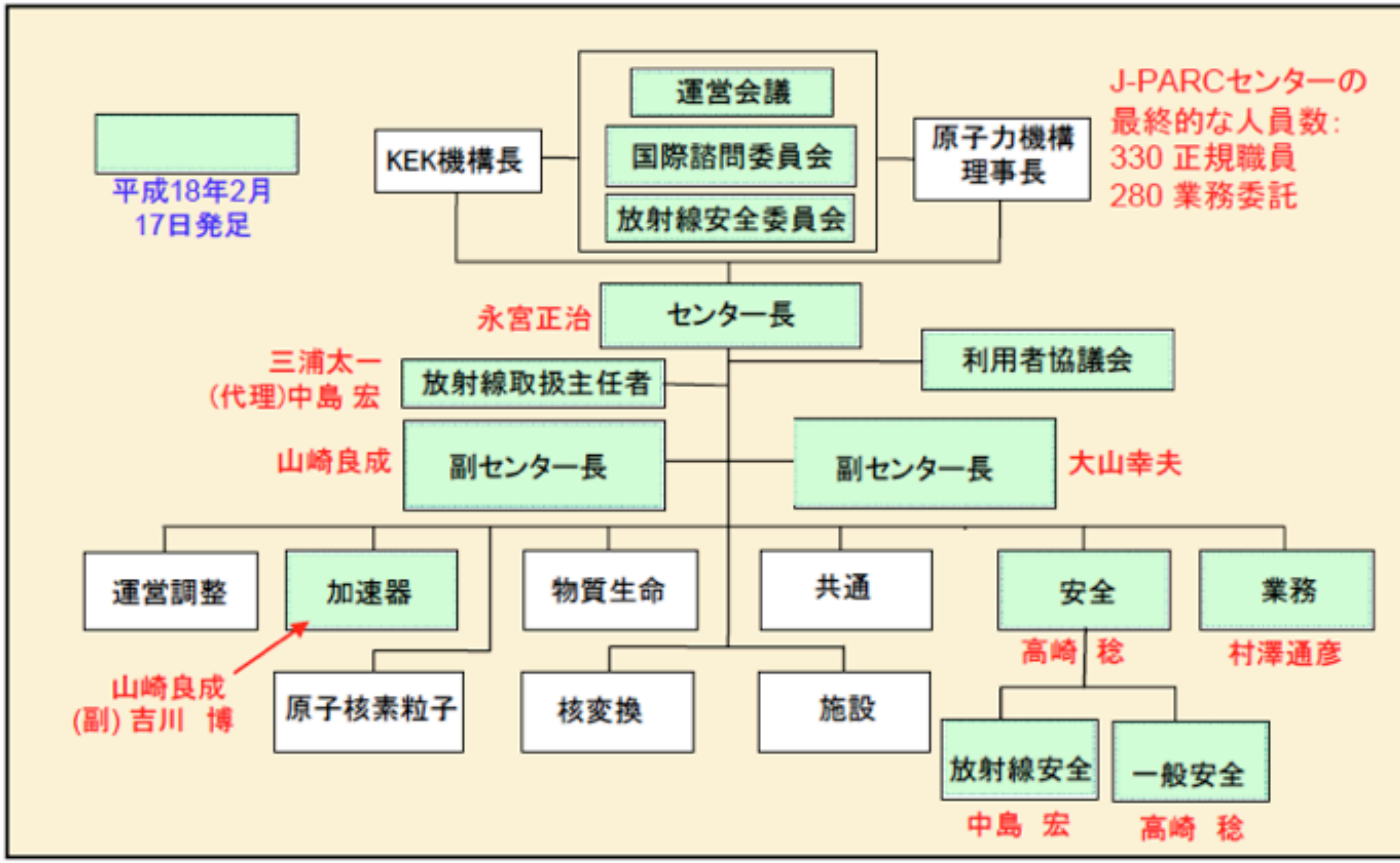
建設組織から運営組織へ

建設組織
両機関がそれぞれ
建設担当施設毎に責任

（建設の進展に沿って移行）

運営組織
両機関がJ-PARC
センターに運営権
限を委譲

発足時の人員数:
62 正規職員



現在の課題
1）いかなるグループをいつ作るか？
2）両機関との業務分担の合意
3）KEKではほぼ全員兼務。JAEAではほぼ全員専務。

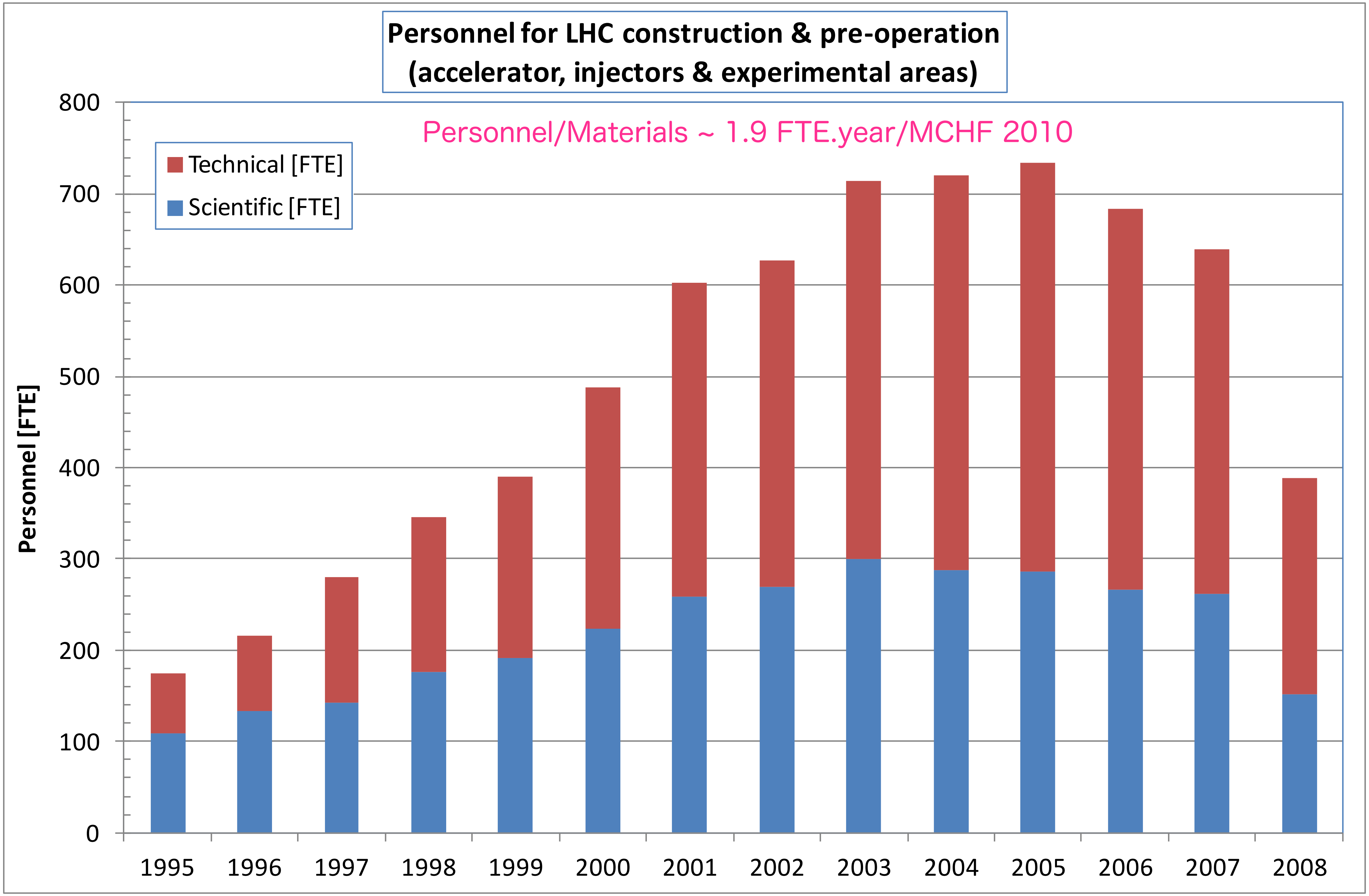
J-PARCセンターの発足：平成18年2月
J-PARCの一体的運営、安全管理

いかにJ-PARCセンターを育てていくかは重要課題！

Ｊ－ＰＡＲＣ評価作業部会（第６回）資料2, 永宮正治, 2007(H19)

LHC personnel expenditure

Source: periodic reports to CERN Finance Committee



Philippe Lebrun, LCWS 12, Univ. of Texas, Arlington, USA

1 swiss franc= 0.81 euro

	Personnel $\times 10^9$ Swiss francs	Materials $\times 10^9$ Swiss francs	Total $\times 10^9$ Swiss francs
LHC machine and experimental areas (incl. R&D, injectors, tests and pre-operation)	1.224	3.756	4.980
CERN contribution to detectors (incl. R&D tests and pre-operation)	0.869	0.493	1.362
CERN contribution to LHC computing	0.085	0.083	0.168
Total CERN costs	2.178	4.332	6.510

Table 2: Costs of the LHC in billions of Swiss francs according to the CERN budget [30].

I summarize the LHC costs, according to the CERN budget, in table 2. I should note that only people directly employed by the LHC are counted under the heading of Personnel", but in practice a large fraction of CERN personnel works for the LHC. Moreover, the data do not include the costs of operation and the contributions to the construction and functioning of the particle detectors made by universities and laboratories outside CERN. For example, the material costs of the largest detector (ATLAS) were 540 million Swiss francs, and CERN contributed to the costs of the various detectors an amount that varied between 14% and 20% of the total.

ref : Big Science and the Large Hadron Collider, Gian Francesco Giudice, CERN-PH-TH/2011-288

LHC Proposal in 1993

In December 1993, a plan was presented to the CERN Council to build the machine over a ten-year period by reducing the other experimental program of CERN to the absolute minimum, with the exception of the full exploitation of the Large Electron Positron (LEP) project, which was the flagship machine of the decade. (extraction in P.6, The Large Hadron Collider : a Marvel of Technology, edited by Lyndon Evans, 2009, CERN and EPFL Press.)

Project	Original cost $\times 10^9$ dollars	Estimated cost in 2011 $\times 10^9$ dollars
Manhattan Project [23]		
Estimated cost at approval (1942): 3 years 1942-1944	0.148	
Total cost: 5 years 1942-1946	2.2	27
Apollo Program [24]		
Estimated cost (1966): 13 years	22.7	
Total cost: 14 years 1960-1973	19.4	120
Hubble Space Telescope (HST) [25]		
Initial estimated cost	0.5	
Construction cost	1.5	
Total estimated cost: 25 years 1990-2014	6.0	8
Superconducting Super Collider (SSC) [26]		
Estimated cost at approval (1987)	4.4	
Estimated cost at cancellation (1993)	11.8	18
International Space Station (ISS) [27]		
Initial estimated cost	17.4	
Estimated cost for development, assembly and operation (1998)	96	120
Human Genome Project (HGP) [28]		
Scientific program in genomics total cost: 14 years 1990-2003	3	4
International Thermonuclear Experimental Reactor (ITER) [29]		
Estimated construction cost (2010): 10 years 2008-2017	17.9	18
Large Hadron Collider (LHC)		
Materials for construction of accelerator and detectors	5.4	6

Table 1: Original cost estimates of some Big Science projects in billions of dollars and their equivalents in billions of 2011 dollars [22]. I used the following conversion factors: 1 euro = 1.4 dollars = 1.5 Swiss francs. I chose an average value of the Swiss franc at the time of construction of the LHC rather than today's exchange rate.

ref : Big Science and the Large Hadron Collider, Gian Francesco Giudice, CERN-PH-TH/2011-288

The cancellation of the SSC was a traumatic event for the particle-physics community around the world. It marked the end of an era, but not the end of large basic-science projects. It represented an important step in the evolution of Big Science, because it highlighted the need for new characteristics in large scientific projects. A broad international collaboration, and a vision beyond the interests of any single country, proved to be essential elements for their success. The LHC, built by a consortium of the European member states of CERN with substantial contributions from almost all of the main countries in the world, has achieved this vision superbly.

ref : Big Science and the Large Hadron Collider, Gian Francesco Giudice, CERN-PH-TH/2011-288

□ ILC中央キャンパスの構想･計画条件の整理
1.人口規模の想定 (1)

- ILC国際研究所職員、実験参加研究者等、支援者等の人数は、運用開始時（11年目）で2,200人、運用定常時（20年目）で2,700人を想定

ILC国際研究所職員及び実験参加研究者等の人数想定

	ILC建設ピーク時（8年目）	ILC運用開始時（11年目）	ILC運用時（15年目）	ILC運用定常時（20年目）
ILC国際研究所職員（常雇職員+臨時職員）	1,600人	1,200人	1,200人	1,200人
実験参加研究者等（断面滞在数）	500人	700人	800人	1,000人
支援者等（断面滞在数）	300人	300人	400人	500人
合　計	2,400人	2,200人	2,400人	2,700人

（注1）ILC国際研究所職員のうち、常雇職員は、研究系職員（研究者等）、技術系職員（技術職、技能職等）、管理系職員（管理職、事務職等）を想定。臨時職員はポスドク研究者等を想定

（注2）実験参加研究者等は、ILCで計画されている2つの実験（ILD、SiD）に参加する研究者や技術者、学生・院生等を想定。実験支援者等は、主に各種専門家（サブコントラクター）を想定

□ ILC中央キャンパスの構想・計画条件の整理

1.人口規模の想定 (2)

Estimation of population in the ILC research center (total population including family)

	Construction period										Operational Period									
年次	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
年度	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
■ 研究者、技術者、管理職員 小計 KEK,2009	500	600	800	1,203	1,605	2,049	2,267	2,388	2,282	2,362	2,200	2,251	2,303	2,358	2,415	2,476	2,540	2,606	2,677	2,751
(1) ILC Laboratory staff (parmanent+temporary) 876	500	600	800	1,000	1,200	1,400	1,600	1,600	1,400	1,400	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
①Permanent staff 713	400	500	600	700	800	900	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
-Research staff 354	200	250	300	350	400	450	500	500	500	500	500	500	500	500	500	500	500	500	500	500
-Technical staff 152	140	175	210	245	280	315	350	350	350	350	350	350	350	350	350	350	350	350	350	350
-Management staff 153+ others 61	60	75	90	105	120	135	150	150	150	150	150	150	150	150	150	150	150	150	150	150
②Temporary staff (postdoctoral) 156 (非常勤)	100	100	200	300	400	500	600	600	400	400	200	200	200	200	200	200	200	200	200	200
(2) Experiment participant Subtotal				203	405	649	667	788	882	962	1,000	1,051	1,103	1,158	1,215	1,276	1,340	1,406	1,477	1,551
①Reseacher				91	182	292	300	354	397	433	450	473	496	521	547	574	603	633	665	698
②Student (graduaite student)				71	142	227	234	276	309	337	350	368	386	405	425	447	469	492	517	543
③Experiment supporter				41	81	130	133	158	176	192	200	210	221	232	243	255	268	281	295	310
■ Construction, Maintenance worker Subtotal	2,730	3,835	3,180	3,240	2,630	2,550	2,610	2,610	2,550	2,360	360	360	360	360	360	360	360	360	360	360
(3) Construction worker (Including supervisor)	2,580	3,655	2,940	2,940	2,270	2,130	2,130	2,130	2,130	2,000	0	0	0	0	0	0	0	0	0	0
(4) Maintenance outsourcing workers	150	180	240	300	360	420	480	480	420	360	360	360	360	360	360	360	360	360	360	360
■ Incidental family Subtotal	782	956	1,215	1,571	1,927	2,303	2,570	2,668	2,580	2,481	2,536	2,599	2,662	2,728	2,996	2,866	2,940	3,015	3,094	3,175
(1) Family of ILC staff	710	870	1,100	1,330	1,560	1,790	2,020	2,050	1,936	1,818	1,844	1,871	1,897	1,923	1,949	1,975	2,001	2,027	2,053	2,079
(Parmanent staff with family)	320	400	480	560	640	720	800	800	800	800	800	800	800	800	800	800	800	800	800	800
(Temporary staff with family)	35	35	70	105	140	175	210	210	140	70	70	70	70	70	70	70	70	70	70	70
(2) Family of experiment participants	0	0	0	97	194	311	320	384	436	482	509	542	577	614	853	695	740	787	837	890
Experiment participants with family	0	0	0	49	97	156	160	189	212	231	240	252	265	278	292	306	322	338	355	372
(3) Family of construction worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(4) Family of maintenance outsourcing workers	72	86	115	144	173	202	230	234	208	181	183	186	188	191	194	196	199	201	204	206
■ Total	4,012	5,391	5,195	6,014	6,162	6,902	7,447	7,666	7,412	7,203	5,096	5,210	5,325	5,446	5,771	5,702	5,840	5,981	6,131	6,286

Human resources at KEK and ILC lab

Lab	year	CFS-Civil construction	CFS-other	Survey and alignment	L-band Cavities and Cryomodules	L-band HLRF	Cryogenics	Magnets and Power supplies	Integrated controls and LLRF	Computing infrastructure	Instrumentation	Dumps and collimators	Vacuum	Other HLRF	Area system specfic	Management	Simulations and operations	ATF, STF, 理論	ビーム輸送	入射器	教官	技官	その他	postdoc/非常勤	合計	コメント
KEK						30		18	9		8		9			153	11	50	9	46					343	ILC関連:2012 電話帳から読む
ILC	1	70	0	0	20	80	40	0	30	100	0	0	0	0	0	60	10								410	図から読む
	2																									
	3																									
	4																									
	5	0	40	70	280	95	45	250	160	100	80	30	10	10	120	300	10								1600	図から読む
	6																									
	7																									
	8																									
	9																									

ILC	建設ピーク	5	5	10	20	20	20	40	20	40	10	10	10	10	20	150	10								400	私案: lab staff ; KEKからの移転 100を含む

Lab	year															Management			教官比率	技官比率	教官	技官	その他	postdoc/非常勤	合計	コメント
ILC-TDR	operation															220			0.40	0.60	252	378	0	0	850	CERNの教/技 =40/60% 適応
ILC-jpn	operation															150			0.59	0.41	500	350		200	1200	ILC立地調査（宮原）
KEK	2009															153			0.70	0.30	354	152	61	156	815	KEKホームページ

ILC建設時の人員プロファイルを初年度とピーク時に数値化して、KEKのもの（電話帳で調べたもの）と比較しています。そして、建設後の『定常』での人員をKEK流の教官、技官，事務官の区別で示しています。ただし、ILCの場合、教官と技官の比率はCERNのscientificとtechnicalの比率、40/60%を適用しました。立地調査会のものはKEKとCERNのほぼ中間となっています。また、ILC建設ピーク時に必要なスタッフ数の私案も載せました。このスタッフ数(400)は立地調査会の初年度のもの(常勤400)と一致しています。

KEKの現状：

2013 研究者総覧（ホームページ）より、総数 609; （ 管理部 153@2009 ）

内訳：加速器施設=243, 素核研=171, 物質科学=102, 共通=93

加速器施設内訳：SuperKEKB=87, LC R&D+理論=50, JParc=70, PF=36

SuperKEKB稼働後の期待されるILC labへの移転数

100 = LC R&D+理論 50 + SuperKEKBより50 (SuperKEKB運転 30確保）

ILC 建設一年目のILC研究所の人員（建設期間=10年；立地調査会の案、宮原氏）

常勤：400, 内訳：教官 200, 技官 140, 事務官 60

非常勤：100

したがって、 不足分は 500-100=400 。

ILC建設のための増員必要数

常勤、非常勤：年当たり100の増員／数年間（非常勤は2年目より）

海外の研究所からの出向（50%の負担とする）と日本からそれぞれ

不足分/2 = 200

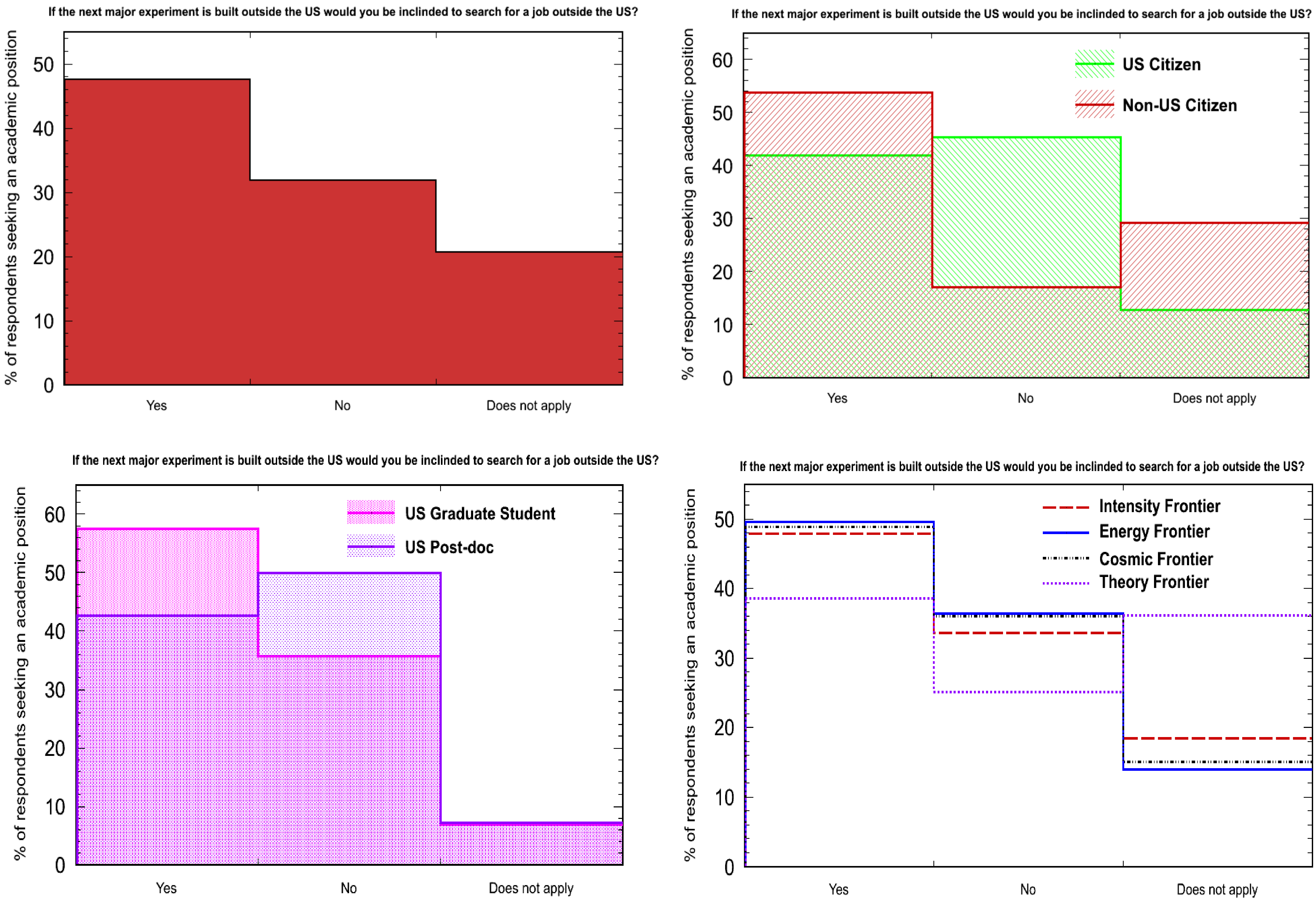
年当たり50の増員／数年間 (トリスタン時に3.5年の間の50/年の実績有り）

定常でのILC研究所の人員 （総数 1,200)

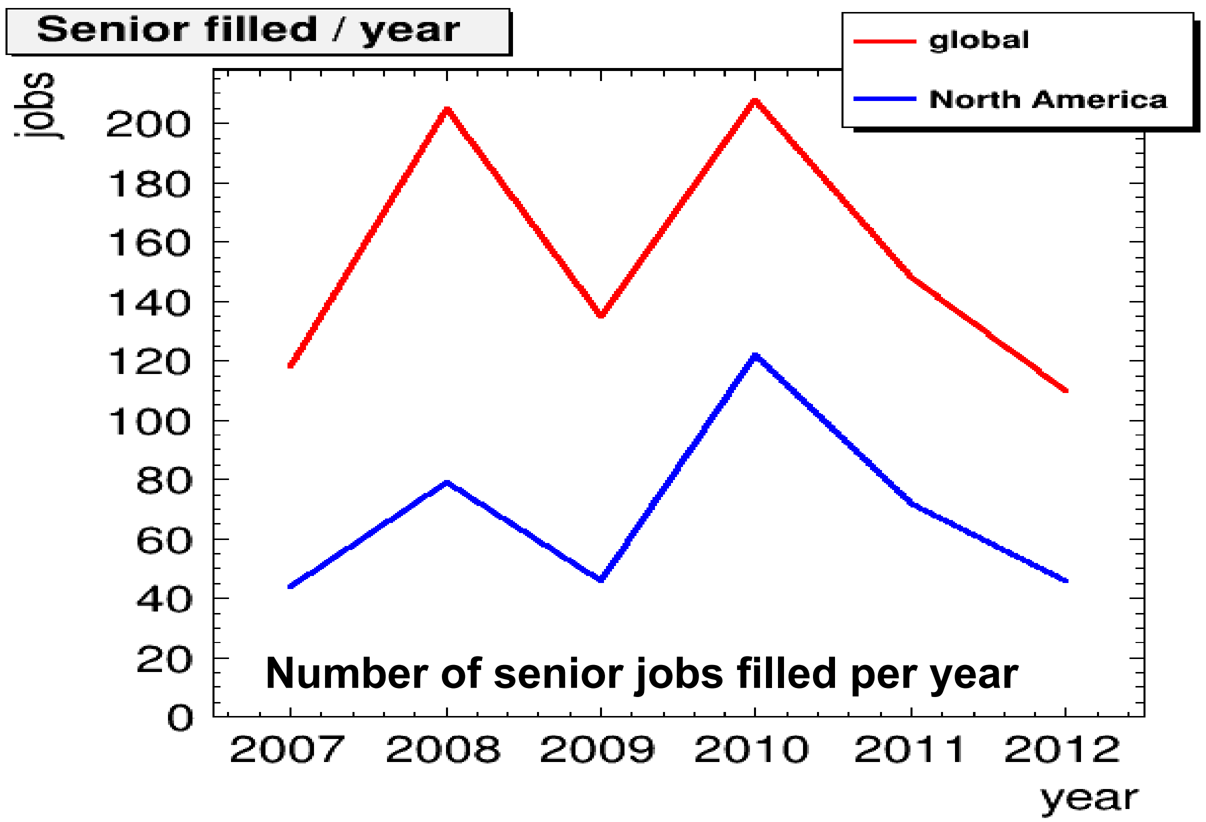
常勤：1,000, 内訳：教官 500, 技官 350, 事務官 150

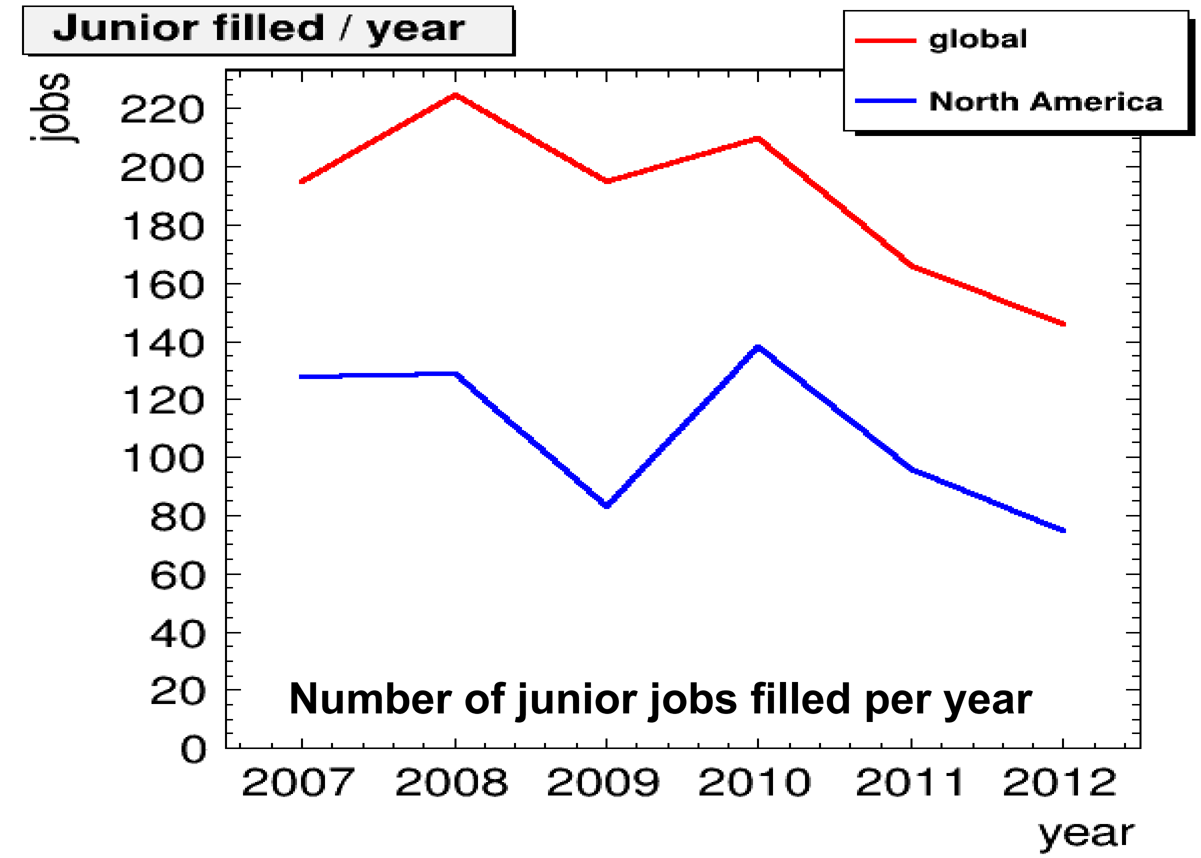
非常勤：200

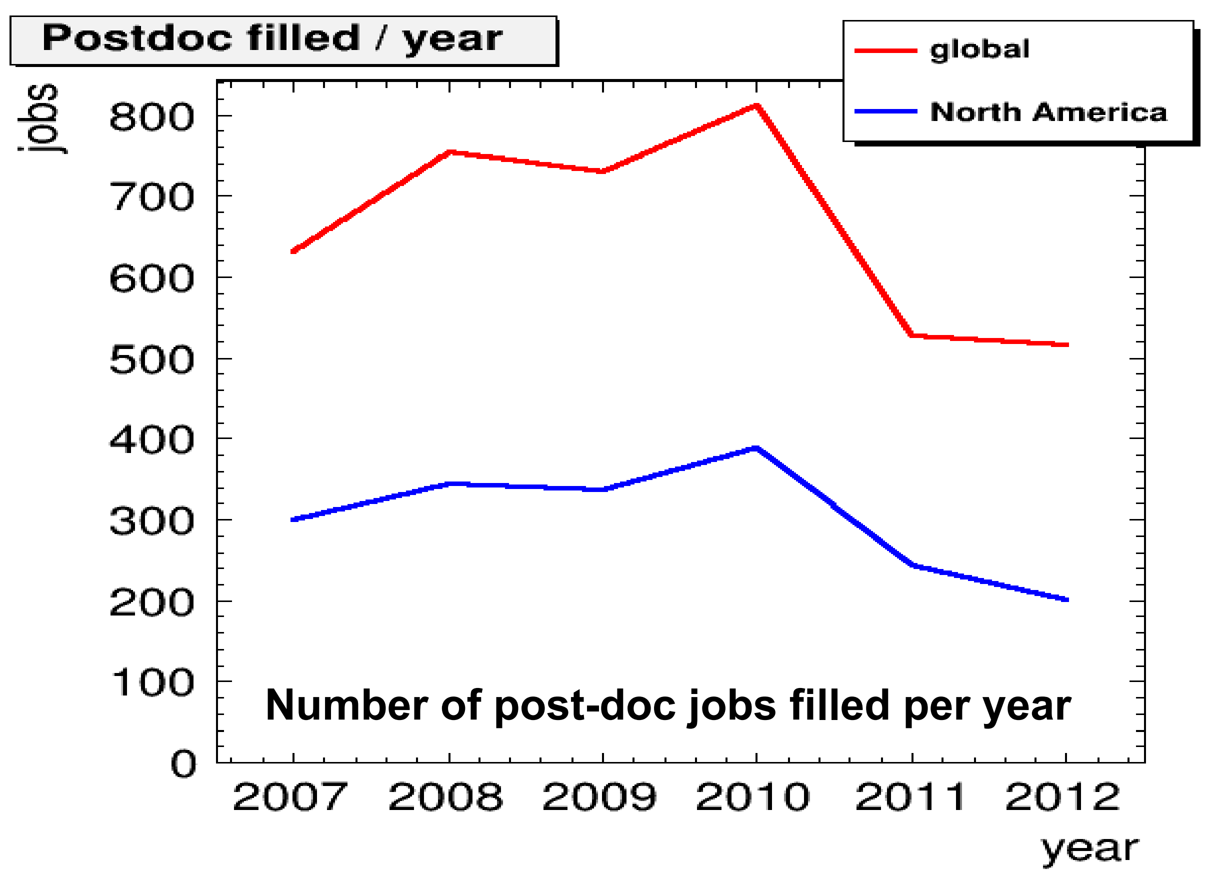
If the next major experiment in your frontier is built outside the US would you be inclined to search for a job outside the US?



Preliminary Data from Spires





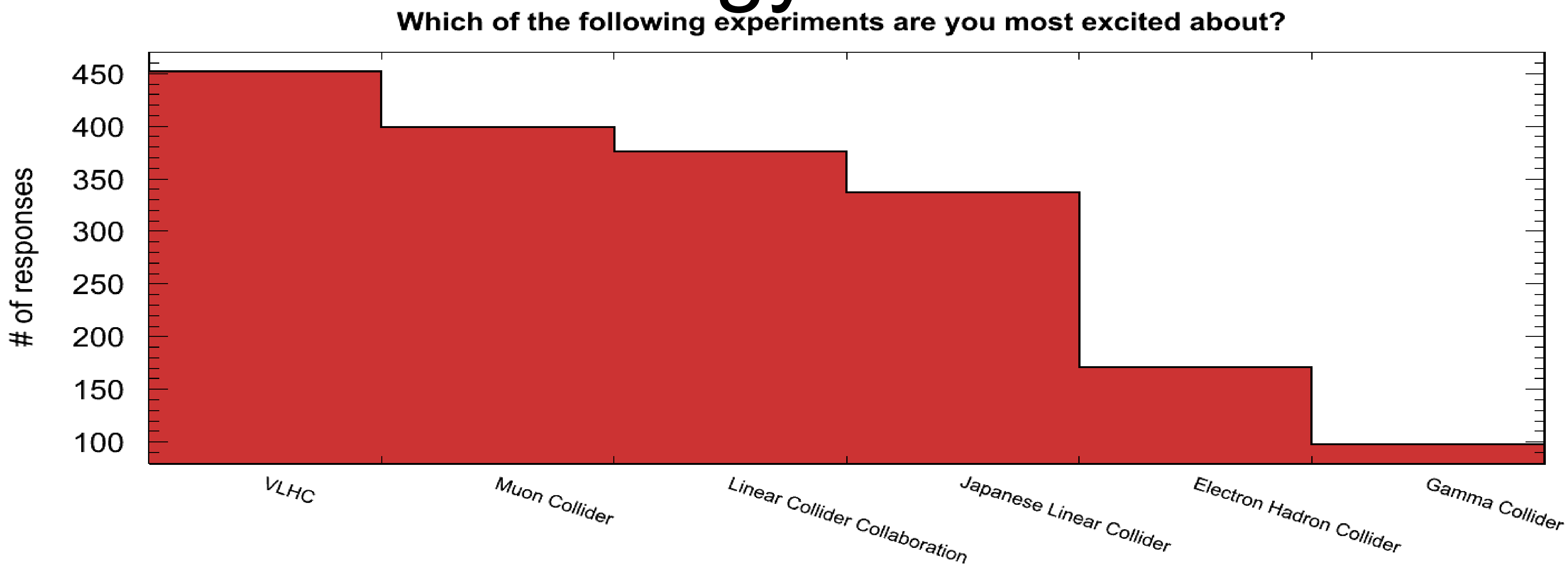


Recall 62% of our young scientists say they intend to pursue a permanent position inside HEP.

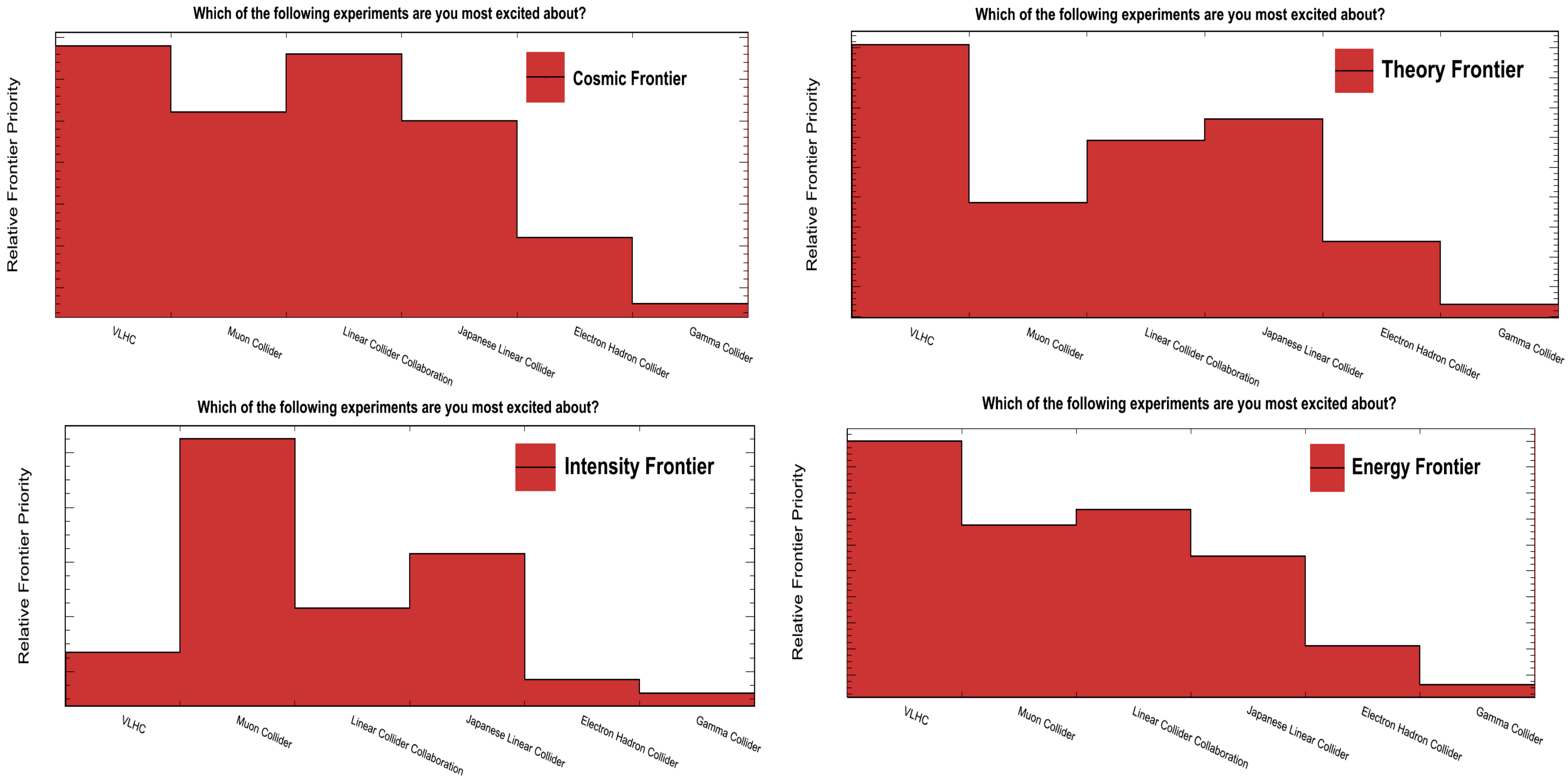
62% x 956 young respondents = **592 job applicants**

~ **160 Global junior jobs** in 2012 listed on Spires

Energy Frontier



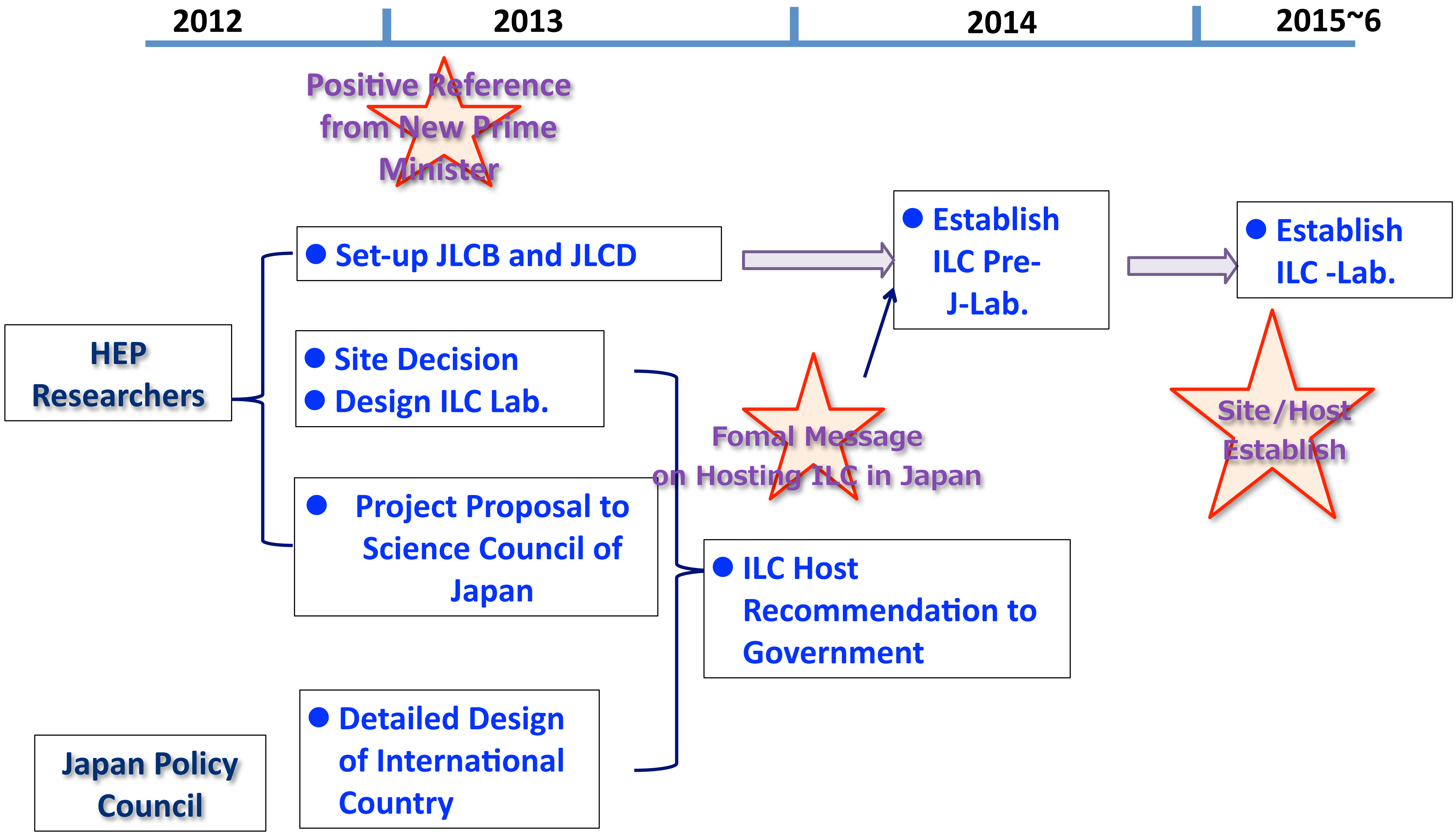
- **<u>Top 3 Energy Frontier Experiments people are excited about (can select more than one)</u>**
  - Very Large Hadron Collider
  - Muon Collider
  - Linear Collider Collaboration
- **<u>We can also look so see which experiments are found most exciting by different demographics</u>**
  - Frontier (shown on the next slide)
  - Current position (to be included in the comprehensive study)



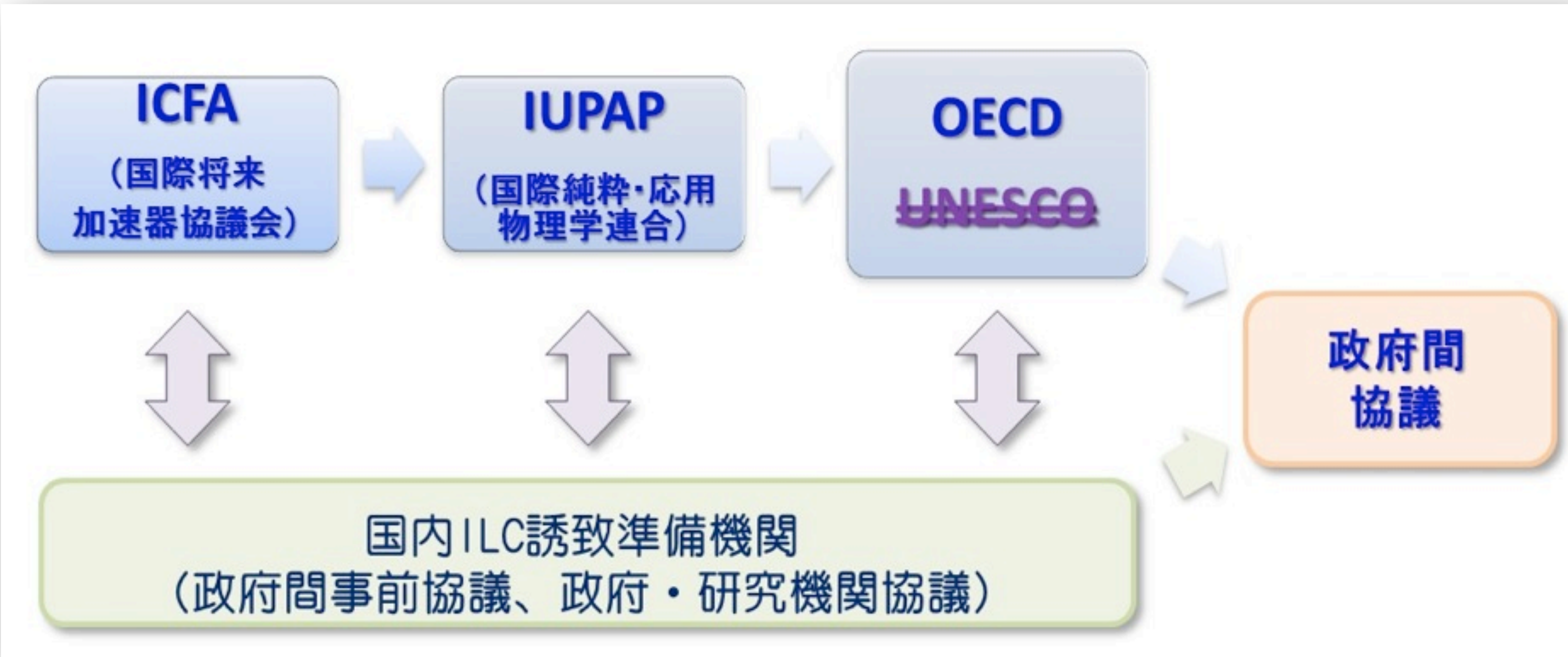
	Cosmic Frontier	Theory Frontier	Energy Frontier	Intensity Frontier
1	VLHC	VLHC	VLHC	Muon Collider
2	Linear Collider Collaboration	Japanese Linear Collider	Linear Collider Collaboration	Japanese Linear Collider
3	Muon Collider	Linear Collider Collaboration	Muon Collider	Linear Collider Collaboration
4	Japanese Linear Collider	Muon Collider	Japanese Linear Collider	VLHC
5	Electron Hadron Collider	Electron Hadron Collider	Electron Hadron Collider	Electron Hadron Collider
6	Gamma Collider	Gamma Collider	Gamma Collider	Gamma Collider

Table 2: The top six Energy Frontier experiments respondents were excited about, broken down by their current frontier.

Toward ILC Construction : Japan Activities



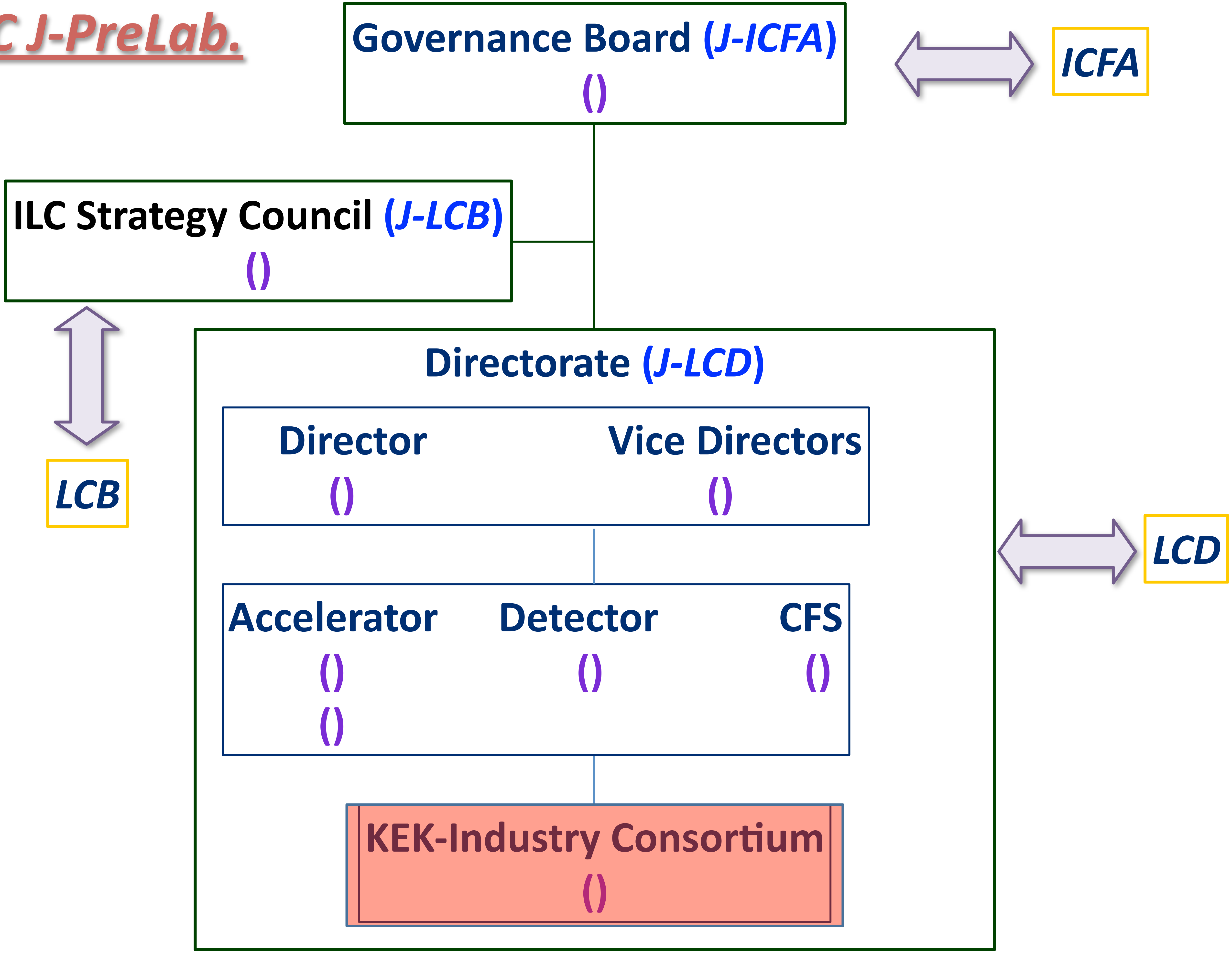
Japanese Bid-to-Host Activities for ILC, Atsuto Suzuki, IHEP-KEK Annual Cooperation Meeting, 4 Feb., 2013



Japanese Government Body for

Japanese Bid-to-Host Activities for ILC, Atsuto Suzuki, IHEP-KEK Annual Cooperation Meeting, 4 Feb., 2013

ILC J-PreLab.


Governance Board (J-ICFA)
()
ICFA
ILC Strategy Council (J-LCB)
()
LCB
Directorate (J-LCD)
Director
()
Vice Directors
()
Accelerator
()
()
Detector
()
CFS
()
KEK-Industry Consortium
()
LCD