4. Specific Issues

	EXPERIMENT	Uni. BS	Uni. BE	UNI. FR	Uni. GE	Uni. LA	Uni. NE	Uni. ZH	ETH -Z	EPF -L	PSI	Tot al
SPS	Newmass (NA 52)		7									7
	Nomad (WA 96)					10						**10**
	Photons and charged Part, from Heavy Ion (WA 98)				7							**7**
	Direct y (UA6) (Analysis)					3						3
LEAR	Cristal Barrel (PI 97)							3.5				3.5
	CP Lear (PSI 95)	7.8		3					8		3	20. 8
	Pbar-P -> Nbar N(PS 206)				**							
	Pbar Lyman, Balmer H lines (PS 207)						-k-fr					
LEP	L3	2.6			11. 5	6			20		4	48. 1
LHC	CMS	1.3						0.2	20		5	31. 5
	ATLAS		3		6.5							9.5
	LHC-B					1					0.5	1.5
	ALICE				0.3							0.3
CERN R&D	RD 2 Tracking/ Preshower Detector		**		**							
	RD 5 Muon trig								**			
	RD 19 Si Micropattern Det,							★★	**	**		
	RD 21 B-Phys Topological Trigger					**						
	RD 30 Optical. Trigger					2						2
DESY	HI							5.8	8		2.5	**16.** 3
SLAC	p & n polar, structure functions (El 43)	7										7
BNL	Rare K decay (E865)	1.3						1.2			3	5.5
PSI	Muons and Pions rare decays							10. 6			6.5	17. 1
	Nucl-Nucl.				5.1						0.5	5.6
	Pionic Hydrogen Atoms						3		**		1	4
Saclay	T] rare decays							0.4				0.4

CA

	EXPERIMENT	Uni. BS	Uni. BE	UNI. FR	Uni. GE	Uni. LA	Uni. NE	Uni. ZH	ETH -Z	EPF -L	PSI	Tot al
Non Acce lerator	Dark Matter detector		6									6
	Double p decay						9					10.
	v e ->v e (Bugey)							1.3				3
	AntiMatter Spectrometer				1.6							1.6
	Time Correlation in primary cosmic rays			**								
	Total	20	16	3	32	22	12	23	55	0	26	209

CH-HEP Resources

			Particle Physi cists				Nucl. Physi cists
	Nber Physi-cists	Perma -nents Prof+ PD	Post doc	Grad, studen ts	Grants Sal. excl.		
Uni. BS	20	3	7	10	735.00	*	9
Uni. BE	16	6	4	6	581.40		
Uni. FR	3	1	1	1	131.40	*	18
Uni. GE	32	10	11	11	1'093.40		
Uni. LA	21	4	6	11	597.60		
Uni. NE	12	2		5	242.00		
Uni. ZH	23	4	7	12	663.00		
ETH-Z	55	11	26	18	1'286.60		
EPF-L	0				0.00		
PSI	26	3	14	9	2'422.60	*incl. contrib. exprmt	9
Total	208	44	81	83	7'753.00		36
Fraction	17.1%				17.9%		

	Grants Salaries excluded KFrs	Physicists. Total	Grants / Phys KFrs/Phys
Part. Phys.	7753	208	37.27
Nucl. Phys.	674	36	18.72
Condensed Matter	12'188	390	31.25
ANDO	22'656	384	59.00
Theory		208	
TOTAL	43'271	1'228	35.29

3ème cycle de physique en Suisse Romande

Forum of Swiss High Energy Physicists

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Bundesamt fur Bildung und Wissenschaft
Office fédéral de l'éducation et de la science
Ufficio federale dell'educazione e della scienza

234.75.100-PZ/pa

3001 Bern, 21. Mai 1990
Postfach
031 61 96 53

Herrn
Prof. Dr. L. Tauscher
CERN
EP

1211 Genève 23

Stellungnahme der Schweizer Elemeatarteilchenphysiker zu LHC/CERN

Sehr geehrter Herr Professor Tauscher

Als Basis für einen Entscheid der Schweiz braucht unsere Delegation im CERN-Rat eine breit abgestützte Stellungnahme der schweizerischen Elementarteilchenphysiker zum Projekr "Large Hadron Collider LHC", welches der CERN Direktor im Herbst 1989 vorgeschlagen hat.

Als Koordinationsstelle für die schweizerische Forschungspolitik môchten wir uns für die Erarbeitung dieser Stellungnahme auf etablierte Strukturen in diesem Forschungsbereich stützen, insbesondere auf das Forum schweizerischer Hochenergiephysiker, welchem Sie zur Zeit vorstehen. Wir wâren Ehnen deshalb sehr dankbar, wenn Sie das im Anhang zu diesem Brief dargelegte Mandat übemehmen kônnten und uns - in Zusammenarbeit mit Ihren Kollegen - *bis Ende Oktober 1990* einen Bericht über das Intéressé der schweizerischen Elementaneilchenphysiker an LHC im weltweiten Umfeld dieses Forschungsgebietes vorlegen kônnten.

Wir planen, diesen Bericht in der zweiten Hâlfte November 1990 im Rahmen einer Tagung, welche sich an die Tagungen in Les Diablerets und Gerzensee der letzten zwei Jahre anschliesst, abschliessend zu diskutieren, um im Hinblick auf die CERN-Ratstagung vom Dezember 1990 über eine konsolidierte Position der Forscher und Forschungsinstitute zu verfiigen.

Wir danken Ihnen zum voraus für Ihre Bemühungen.

Mit freundlichen Grüssen

BüNDESAMT FÜR BILDUNG UND WISSENSCHAFT
Der stellvertretende Direktor

G.M. Schuwey

MANDAT

Stellungnahme der Schweizer Elementarteilchenphysiker zu LHC

1. Eine ad hoc Untergruppe des "Forums Schweizer Hochenergiephysiker", im folgenden "LHC-Beratungsgruppe" genannt, erarbeitet unter dem Vorsitzenden des Forums, Herm Prof. L. Tauscher,

   bis Ende Oktober 1990

   einen Bericht "Stellungnahme der Schweizer Elementarteilchen-Physiker zu LHC am CERN" zu Handen des Bundesamtes für Bildung und Wissenschaft.

2. Die Organisation der Arbeiten der LHC-Beratungsgruppe, zusammengesetzt aus 5 bis 8 Fachleuten, und deren Zusammensetzung ist Herm Prof. Tauscher freigestellt.

3. Der Bericht soil die Ergebnisse der ECFA Konferenz zu LHC von anfangs Oktober 1990 in Aachen mitberiicksichtigen und in der Schweiz in einem Treffen, an welchem allé Interessenten der Elementarteilchenphysik teilnehmen kônnen, vorgestellt und besprochen worden sein.

4. Die Stellungnahme der LHC Beratungsgruppe soil insbesondere folgende Fragen beantworten:

   - Welche schweizerischen Forschungsgruppen sehen eine Nutzung des LHC vor und haben beieits Schritte in dieser Richtung eingeleitet?
   - Welche Gruppen kônnten dariiber hinaus und unter welchen Bedingungen einen LHC nutzen?
   - Welches ist das Verhâltnis zwischen LHC und SSC?
   - Welches ist das Verhâltnis zwischen LHC und eventuellen anderen Projekten des CERN (BMF, CUC, andere)?
   - Welches ist das Verhâltnis zwischen LHC und anderen europaischen Anlagen und Projekten in diesem Gebiet (HERA, andere)?
   - Welches ist der voraussichtliche Aufwand (personell, ausriistungsmassig, finanziell) fur eine sinnvolle Nutzung von LHC durch schweizerische Forschergruppen? Wieviel davon ist Umlagerung aus anderen Projekten?
   - Gesamtbeurteilung: Befürworten die Schweizer Elementarteilchen-Physiker den Bau von LHC?

FORUM of Swiss High Energy Physicists

Invitation to the

Special meeting of the FORUM on LHC

19 October, 1990 at 9.00 hrs
at
CERN, Geneva
Council Chamber

Program:

09.00	**L.Tauscher,** *Introduction*
09.15	**C.Rubbia,** *CERN's future, projects and prospects*
10.00	**G.Brianti,** *The LHC Project*
10.20	**W.Schnell,** *CLIC studies and related R&D worldwide*
10.50	**COFFEE**
11.15	**W.Hoogland,** *LHC in the current environment of CERN*
11.40	**R.Gatto,** *Physics for new colliders*
12.30	**LUNCH**
14.00	**A.D.Clark,** *Future experiments at high energy colliders*
14.50	**C.Joseph,** *Results of the LHC enquiry*
15.20	**L.Tauscher,** *Conclusions of the LHC Advisory Board*
15.50	**DISCUSSION**

Forum of Swiss High Energy Physicists
LHC Advisory Board

To

Distribution list

Geneva, 13.7.1990

Dear Colleague,

The Federal Office for Education and Science has asked me to set up an advisory group to evaluate the view of swiss high energy physicists on the construction of LHC (c.f. attached letters). After discussions with the Institutes directly involved in high energy physics the following advisory group has been established: *M.Bourquin, A.Clark, R.Eichler, R.Gatto, H.Hofer, C.Joseph, K.Pretzl, P.Truol* and myself as the chairman.

In order to obtain a broad and representative view we have decided to work out a questionnaire on the relevant matters and to send it to group leaders and senior physicists in high energy and particle physics.

Please complete the questionnaire at your earliest convenience
but
not later than September 15. 1990.
and send it back to
Prof. L.Tauscher
CERN-EP
1211 GENEVE 23

Feel free to add comments or remarks you consider important and relevant to the question. Please discuss the subject with your colleagues and in your group.

The board members are ready to help with additional information. The persons of the distribution list who are underlined have been provided with the relevant documents.

With best regards,

L.Tauscher
Coordinator of the Forum
of Swiss High Energy Physicists

Distribution*:

Basel University:	Backenstoss, Tauscher
Bern University:	Pretzl, Hugentobler, Moser, Hasenfratz, Leutwyler, Minkowsky
Fribourg University:	Dousse, Kern, Schaller
Geneva University:	Bays, Bourquin. Clark, Extermann, Field, Heer, Hess, Kienzle, Leluc, Martin, Perrier, Rosselet, Rapin, Stone, Gatto, Piguet, Ruegg
Lausanne University:	Gailloud, Joseph, Wanders
Neuchâtel University:	Jeannet, J.L.Vuilleumier, Derendinger
Zurich University:	Amsler. Engfer, U.Straumann, Truol, N.Straumann, Wyler
ETH Zurich:	Eichler, Gerber, Leisi, Hofer, Pohl, Viertel, Kunszt, Ch.Schmid. Froehlich
PSI	Menth
	J.Schacher (ACCU, for information)

**Each institute will have its own entry when evaluating the enquiry.*

Forum of Swiss High Energy Physicists
LHC Advisory Board
Questionnaire

To be returned before September 15. 1990 to
Prof. LTauscher
CERN-EP
1211 Geneve 23

Name:.....

Institute:.....

LHC relative to other "supercolliders"

1. How do you rank the scientific potential of the following future machines* (moderate, good, very good, excellent)?

LHC :.....
SSC :.....
UNK :.....
RHIC :.....
CLIO : .....
"top"-factories(e^+ e")**:.....

**see annexed information. More details may be provided by the LHC Advisory Board Members*
"e.g. 500 GeV Linear collider as presently discussed at various places

comments:

2. How do you rank the educational value for students working in very large experiments (UA, L3,H1 etc.)? Specify positive and negative aspects according to your experience:

3. Working at CERN poses only minor problems for swiss groups. What are the conditions for equally profitably (intellectual return, personal exchange, recruitment etc.) participating in experiments very remote from Switzerland such as at DESY, SSC, UNK or KEK?

4. How do you judge the usefulness of the construction of a supercollider and the experimental equipment for industrial HiTech stimulation in general and for swiss industry in particular? Specify!

Swiss high energy and particle physics intentions

5. Do you or does your group intend to participate in experiments at LHC?

O Yes, measures are already taken
Which measures?

O Yes, but a decision will only be taken after LHC is approved

O Yes, but only when current activities will be finished
Which activities?

O Yes, but only with low priority
What is your first priority?

O Possibly, if other projects can not be realised
Project of your preference:

O No
What will be your high energy or particle physics activity in the nextl 0 to 15 years ?

If yes, which of the physics at LHC do you envisage?

O pp
O ep
O AA

comments:

6. What will be the estimated size of your group at LHC? (please answer, even if LHC is not your first choice or LHC will not be your only activity)

No of grad.students.....
No of post docs.....
No of senior physicists.....
No of technicians.....

What portion of your actual group (in %) would this correspond to?

comments:

7. Do you see any need to increase the number of available positions in order to sensibly utilize LHC? Specify!

8. Which funding level, excluding salaries, do you consider necessary for participation of your group at LHC (today's prices, rough estimates, LHC commissioning assumed in 1998)

a. Initial detector R&D (starting 1990):..... sfr/year
b. Preparation and setting up (starting 1993):..... sfr/year
c. Exploitation (starting 1998).:..... sfr/year

What portion of your current budget does this correspond to (approx.)

fora: ....., forb: ....., fore: .....

comments:

9. Do you expect that your group, while being involved at LHC, would participate in any other project. If so how much additional funding would you request for non- LHC projects. Specify!

10. Is there any equipment you could transfer from current experiments (e.g. LEP) to LHC?

11. Do you consider traditional funding sources (NF,Canton,Schulrat) sufficient to sensibly utilize LHC? Specify!

12. Any other comments

Date..... Signature.....

ON HIGH-ENERGY THEORY RESEARCH IN SWITZERLAND

J.-P. Derendinger, Neuchâtel University
R-ECFA meeting, Bern, March 3rd, 1995

CH

1) General remarks and numbers on theoretical physics in Switzerland (*)

*) Sources:
Mainly: Evaluation of Physics Research in Switzerland: Basic Report (FOP 17/1994)
Also: Teilchenphysik, Astrophysik and Astronomie in der Schweiz: Stand und Zukunft (FOP 12/1992);
Elementarteilchenphysik in der Schweiz (SHK, 1992).

Theoretical physics is present in all swiss universities [Basel, Bern, Fribourg, Genève, Lausanne, Neuchâtel, Zürich], in both Swiss Institutes of Technology [Lausanne (EPFL) and Zürich (ETHZ)] and in the Paul Scherrer Institute (PSI).

- **Total number** of theoretical physicists in these institutions:

about **220**

This is about **14 %** of the total number of physicists in swiss institutions, which is close to **1600.**

This number is also very similar to the number of high-energy experimental physicists **(210).**

- The **average size** of a research group in theory is

4.9 collaborators/group

Large variability (standard deviation: 2.6, size range: 1 to 12).

- **Composition of a research group:**

  1 professor or group leader (permanent), by definition

  1.8 postdocs

  2.1 physicists with a diploma (mostly PhD students)

The very large majority of postdocs positions have non-permanent positions (mainly 2 years, or longer 4-6 years contracts). Most include some teaching duties.

Financial aspects:

- **Origin of salaries:**

[the numbers below are extracted from the questionnaires used for the evaluation of physics research in Switzerland, evaluations only!]

	Public	SNF	others
Professors permanent positions	100 %		
Postdocs	63 %	25 %	12 %
PhD students	59 %	26 %	15 %

SNF = Swiss National Foundation;
others = european or private sources, and also the missing part of partial positions.

- **Research grants:**

Mainly from the Swiss National Foundation. About **3000 SF** per **year** and **theorist** (this figure is not very reliable; but a realistic approximation).

Grants from european projects and networks have an increasing importance (see below).

2) General remarks and numbers on high-energy theory in Switzerland

The boundary of high-energy theory is of course hard to draw. Swiss universities have strong (qualitatively and quantitatively) research groups in **mathematical physics.** Their interaction with high-energy theory fluctuates with time (see for instance: developments in strings since 1985 and work in two-dimensional field theories, integrable models and conformal field theories).

In the following, I will mention the existence of activities in **mathematical physics** which have been **recently** of direct interest for high-energy theory, but I will **not** include them in the statistical data shown below.

I will use the same procedure for activities in **astrophysics, cosmology** and **gravitation.**

With this definition, high-energy theory exists at the universities of **Bern, Genève, Lausanne, Neuchâtel, Zürich,** at **ETH Zürich** and at **PSI.**

[EPFL does not have any particle physics, **Basel** has theoretical atomic and nuclear physics, with a recently established group in "astronuclear" physics.
The theory group in **Fribourg** works on condensed matter].

- **The high-energy theory groups:**

Personnel:

Institution	Permanent staff	Postdocs	PhD students
Bern	4	4	5
Geneva	3	3	3
Lausanne	1	1	1
Neuchâtel	1	2	2
Zurich Univ.	1	1	4
Zürich ETH	2	3	2
PSI	1	2	2
Total	13	17	19

Total: **49 high-energy theorists**

About 22 % of all swiss theoretical physicists.
(Ratio high-energy / total for expt, physicists is 15 %).

- Out of the 12 permanent positions in universities and ETH, **only two** are not professor (ordinary, extraordinary, or similar) positions:
  Intermediate permanent positions hardly exist!

- It should be noticed that approximately **30 %** of the faculty positions will have to be renewed within 5 years, and **50 %** before 2005.

3) Domains of research

General remarks:

- The domains of research are very diverse, covering most of the field.

- In each institution and in each group: several almost independent subjects.

- The collaborations between swiss groups are not very common. Most groups have very intense international contacts. The very large majority of the publications include non-swiss authors.

- One could expect more regular collaborations between the CERN Theory Division and swiss groups.

- In view of the size of the experimental effort, phenomenology is somewhat weakly represented.

Participation in European collaborations:

The importance of the programs supported by the **European Union** for swiss high-energy theory groups has very significantly increased in the last years. A **non-negligible part** of the travel and visitor budget of many groups is now of european origin.

This is of particular importance in view of the cuts presently applied on the budgets of the Swiss National Foundation and of the academic institutions.

Swiss groups participate in the following ongoing projects:
(this list is maybe not exhaustive):

- "Phenomenology of the standard model and alternatives for present and future high-energy colliders" (ETH)
- "Physics at high-energy colliders" (ETH)
- "The study of the electroweak symmetry breaking at future colliders" (PSI, Genève)
- "New methods in quantum field theory: infinite symmetries in statistical mechanics and string theory" (Genève)
- "Gauge theories, applied supersymmetry and quantum gravity" (Neuchâtel)
- "Eurodafne network" (Bern)

This support should not disappear !

Domains of research:

1) Bern University

The largest high-energy theory group, together with an important group working on classical and quantum gravity. The entire group has 8 permanents, 8 postdocs, 10 PhD students. Approximately half of this group is working on high-energy particle theory (in the "traditional" sense), with 4 professors (J. Gasser, P. Hasenfratz, H. Leutwyler, P. Minkowski).

Subjects:
1) Lattice regularization of quantum field theory.
2) Chiral perturbation theory, quark masses, CP violation.
3) Unified theories of interactions, classical and quantum gravity.

2) Geneva University:

3 permanents (2 profs.): R. Gatto, O. Piguet, H. Ruegg;
3 postdocs, 3 PhD students

1) Phenomenology: predictions from extended gauge theories, strong electroweak breaking, heavy mesons, heavy ion physics, chiral phases of QCD.
2) Quantum groups (in particular quantum extensions of the Poincaré group).
3) Topological field theories (ultraviolet properties, observables).
4) Supersymmetric gauge theories (W.-Z. gauge, scale invariant models

with soft mass breakings of supersymmetry).

- The two professors will soon retire (1995 and 1996). One position is opened for renewal.
- Apparently, an overall tendency to cut jobs.

3) Lausanne University:

1 permanent (G. Wanders), 1 postdoc, 1 PhD student

Chiral perturbation theory and exact properties in pion-pion diffusion.

- Prof. Wanders is approaching retirement. His replacement is in progress.

4) Neuchâtel University:

1 permanent (J.-P. Derendinger), 2 postdocs, 2 PhD students

1) Supersymmetry and supergravity applied to unified theories.
   Superstring unified models (quantitative predictions on "low-energy physics).
2) Finite-temperature effects in quantum field theory.
3) Some activity in neutrino physics (masses, double beta decay, . . .) and phenomenology beyond the standard model.

5) Paul Scherrer Institute:

1 permanent (F. Jegerlehner), 2 postdocs, 2 PhD students.

1) Phenomenology: e^+e^- physics (LEP, NLC), mainly precision physics physics at the Z-peak, W-pair production, Higgs physics
   Some activity in Dafne phi-factory.
2) Lattice QCD (massive parallel computing project at the CRAY T3D at EPFL Lausanne): weak matrix elements, dynamical fermions.

- Related theoretical activity: nuclear physics, low-energy physics: 2-3 permanents (Locher, Rosenfelder), 3 postdocs, 1 PhD student.

- The high-energy theory group at PSI has always been very **small** (It has been created around 1988). This could have been considered appropriate as long as the experimental program was in nuclear or low-energy particle physics only. It would seem wise to develop the high-energy

theory group in parallel with **LHC** related activities at PSI. A local theory support seems highly desirable. In any case, the present size of the group seems to be an absolute minimum.

6) Zürich (E.T.H.):

2 permanents (C. Schmid, Z. Kunszt), 3 postdocs, 2 PhD students.

1) Phenomenology: QCD, jet physics (HERA, TEVATRON, LHC,...), electroproduction, small x physics, Higgs, W phenomenology
2) Supersymmetric models (R-parity breaking), supergravity (and string effective supergravity)

- C. Schmid has been recently working on quantum field theory in curved space.
- ETH has a large and top-level mathematical physics group (conducted by J. Frohlich) which has also projects in relation with high-energy theory: in particular, works on quantum groups, quantum field theory, conformal field theories, integrable models, non-commutative geometry applied to models of particle interactions.
- There is also some activity on lattice calculations and numerical simulations at the ETH computer center (which hosts 2-3 physicists).
- Compared with the size and potential of the Institut für Theoretische Physik and with the scale of the experimental effort, the size of the high-energy theory group can be considered as very small. Its importance has decreased in the last years.

7) Zürich (University):

1 permanent (D. Wyler), 1 postdoc, 4 graduate students

1) QGD (heavy mesons, chiral lagrangians); weak interaction phenomenology at high and low energies; phenomenology of supersymmetry.
2) Quantum field theory (renormalization and path integral...).

- Related activités: an important group working on **cosmology** and **astrophysics (N.** Straumann and collaborators). Also, works on the electromagnetic interaction, as well as nuclear or pion physics.

Summary of research activities:

Institution	Group size ([1])	Subjects:
Bern	4 + 4 + 5 ([2])	Chiral pert, th., quark masses, CP violation, lattice Q.F.T., unified th., gravity
Geneva	3 + 3 + 3	SM and BSM phenom., topolog. F. T. , quantum groups, SUSY
Lausanne	1 + 1 + 1	Chiral pert. th.
Neuchâtel	1 + 2 + 2	SUSY, supergravity, superstrings, hot F. T., neutrinos, unified theories
P.S.I.	1 + 2 + 2	Phenom.: $e+e^-$, W, Z, H, Dafne, lattice QCD
Zürich E.T.H.	2 + 3 + 2	Phenom.: QCD, jets, H., W, SUSY, supergravity
Zürich Univ.	1 + 1 + 4	phenom.; QCD, SM, BSM, SUSY, Q. F. T.

SM = Standard Model
BSM = Beyond Standard Model
H. = Higgs
SUSY = supersymmetry
(Q.)F.T. = (Quantum) Field Theory

(1) Group size: # permanents + # postdocs + # PhD students

(2) Including activities in gravity: 8 + 8 + 10

Impact économique direct du CERN en Suisse (MCHF)

	1992	1993
Commandes et contrats à des firmes établies en suisse	99.7	75.4
EOS - Electricité	10.8	8.9
PTT - téléphone et affranchissements	3.4	2.7
Assurances des biens et des personnes	2.0	2.1
Autres dépenses (frais représentation, voyages,...)	5.2	5.2
Dépenses des membres du Personnel[1] (titulaires, boursiers et attachés payés)	178.7	161.3
Dépenses des pensionnés[1]	23.9	30.4
Dépenses des utilisateurs[1]	141.2	134.9
Total	**464.9**	420.9

CH

Pour ton information, ci-joint l'étude (sommaire) que je viens de faire suivre à Bourguin, à sa demande.

Amicalement

Gilles

[1] Concernent les résidents en Suisse, compte non tenu des éventuelles dépenses faites à l'extérieur du territoire. Celles-ci sont supposées être compensées par les dépenses effectuées en Suisse par les résidents en France.

Particle physics in Switzerland
January '94

(i) Experimental particle physics.

The number of experimental particle physicists in Switzerland is about 200, with a total number of academic staff of about 170.
There are research groups in 7 universities : Basel(lO), Bern (15), Fribourg (5), Geneva (30), Lausanne (19), Neuchâtel (13) and Zurich (17)). There are also research groups at the ETH-Zurich (52) and at PSI (25), formerly SIN (Villigen). The size of the community scaled to the population is quite strong when compared to the member state average.
There is a very sizeable participation in research at LEP (concentrated on L3), with 44 physicists. There is a strong interest in several LEAR experiments and in particular CP-LEAR . There are altogether 33 physicists working at LEAR. There is also a good interest in heavy ion research and in neutrino physics (NOMAD). There is a strong participation in RD experiments and already an important involvement in LHC.
The number of Swiss physicists working at HERA is 6. The PSI programmes involved about 40 physicists in '90.
There are 50 physicists working in astrophysics (Bern). Some of them are on cosmic ray studies which present increasing links with particle physics.

(ii) General outlook.

The"Forum of Swiss High Energy Physicists"(Chairman L.Tauscher) , which reports to the **Federal Office for Education and Science,** recognizes in its '90 report that "the future of Swiss particle physics is strongly linked to CERN" and that "LHC as the next CERN project is accepted and supported by a broad fraction of Swiss particle physics". It bases its statements on the result of an extensive enquirery with the Swiss particle physics community. At present about 60 academic staff have indeed turned to the LHC and 60 others say that they would turn to the LHC if they do not find any longer a

lower energy facility to which they would give preference. Swiss groups will not concentrate on one LHC detector and this is understandable in view of the strength of the community. At present, groups have joined ATLAS (Bern, Geneva) and others (in particular ETH) have joined CMS. Several are however still undecided. The Swiss particle physics community is for a quick positive decision on the LHC. It is recognized that the usual funding sources may not be fully adequate for the financing of the LHC detectors and the related R&D work. New funding ressources are called for. The "Forum of Swiss High Energy Physicists" considers (again in its '90 report) that a Swiss participation in LHC detectors at the level of 31 MSF should be looked for. The Swiss participation to the LEP detectors (L3 only) was 21 MSF (’86)

In connection with the future of particle physics in Switzerland a special mention should be made of the Beck report of '92 (Forschungs Politik) which was commissioned by the Swiss Science Council. It remarks that at present about 1/4 of university and polytechnic school professors in physics are high energy experimentalists and that about 1/3 of these institutions of higher learning have strong high energy groups. Particle physics is very well represented in the Swiss physics community as a whole. The report stresses that, at the university level, high energy experimentalists are on the average not more costly per head than physicists working in other branches. This results from the fact that most of the funding for heavy research comes from sources outside the universities and is being allocated according to specific projects. In some of the member states, universities are reluctant to open professorships in experimental particle physics not to be implied in heavy spending. They should reflect on the Swiss example !
The number of new PhD in experimental particle physics is of the order of 10 per year.Many of them are expected to eventually find employement in Industry.

The report recommends that experimental particle physics should be kept alive in all the universities where it is present, with strong groups in a few of them, but that more coordination should exist for graduate teaching between the universities and the polytechnic schools. The francophone universities already collaborate much in the framework of their "Troisième cycle de Suisse Romande".The report also recommends a more global approach for the construction of heavy equipment and points at a special rôle which could be played by PSI.

(iii) The organization and funding of research.

The funding available for research is approved and allocated by the **Federal Council,** which is the supreme instance of the Swiss Confederation. The Federal Council takes advice on that matter from the **Swiss Council for Science** (Chairperson Mrs, V.Mayer).
The Swiss CERN contribution is paid through the **Federal Department of Foreign Affairs (M.**Cotti), where the International Organizations are under Ambassador. F. Nordmann. It is of the order of 35 MSF. There is a division for Science (Head J.Leutert) and a subdivision for International Scientific Affairs, DFAE (Head M. Gottret). Mr. Gottret is the person to contact for questions associated with the CERN contribution. He is also the person to approach when discussing any special host state contribution but one has then also to approach for that matter Mr.Fabre, from the Federal Department of Finance.

Funding for research in Switzerland follows a direct route when it comes through the Polytechnic Schools and PSI. This is then purely federal funding. The ~funds come from the **Federal Department of the Interior (R.**Dreyfus , and are allocated through the **Division for Science and Research** (head H.Ursprung). They are channelled through the **"Schulrat"** (head R. Crottaz) and go to ETH (head J.Nüesch),to EPFL (head B.Vittoz) and to PSI (head Eberle). The particle physics research budget along that line is of the order of 12 MSF. This funding is separate from the budget of PSI which is of the order of 25 MSF. This is the route for important special funding for physicists from the ETH as those allocated for the LEP detectors and those which could be allocated for the LHC detectors. The granting of special funding is however done under the control of the **Federal Office for Education and Research** (FOER) which is introduced later. The FOER oversees the general organization of research.

University research groups are supported (salaries and some research funds) by the universities which are funded at the Cantonal level. Research (Material funding and "soff'salary funding) is however mainly supported through the **Swiss National Fund for Scientific Research** (SFNSR). This is done according to specific projects. The present typical funding level for particle physics is of the order of 7.5 MSF/year. The budget of the SFNSR comes from the Confederation and is granted on a 4 year basis by the Federal Council.
The allocation of special funding to university groups is likely to also become possible through the FOER. This is however where a "sum rule"

effect would come into the picture and it could affect not only the ETH funding but also most of the special funding which would be "hearmarked" LHC, one way or the other.

The Federal Office for Education and Research, previously mentioned, is part of the federal administration. Its director is S. Schuvey. There is a division for Research (head P.Zinsli) and a subdivision for research in the international organizations (head J.P.Ruder)

FOER uses as an advisory body for particle physics the **Forum of Swiss High Energy Physicists** (chairman L.Tauscher), which was previously mentioned. This is where special recommandations for the LHC are formulated.

(iv) Theoretical physics.

Research in theoretical physics follows a brillant tradition and is very active in many universities and in the polytechnic schools. Switzerland counts many well known theorists. Research groups cultivate numerous international links and collaborations.

(v) Switzerland at CERN.

Number of Staff members (415), Cat-1 (3), Cat-2 (83). Number of fellows selected in '92 (3).
Contribution to the CERN budget : about 4%

(vi) VIP's to be invited.

Geographical proximity is such that CERN is very well known among Swiss decision makers. One should however invite Mrs V.Mayer, Chairperson of the Swiss Council for Science.

File t!4

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MILAN P. LOCHER

Prof. M. Jacob/DSU
CERN
C2 I I Geneve 2?

Your ref. Our ref. Würenlingen/Villigen, May 6 1994

Dear Maurice

Here are two documents from +)
the Swiss Science Council on
the interrelation between Astro-
and Particle physics. I U <2 , Cu-er-c
triggered by certain ideas of
concentration (and reduced spending
on hardware in particle physics) by
Mr. Vasella which we do not fancy.
Presently, for similar reasons, a
review of all of physics in Switzerland
is being prepared, headed by V. Meyer.

Best regards

Milan

+) In addition to my letter of today.