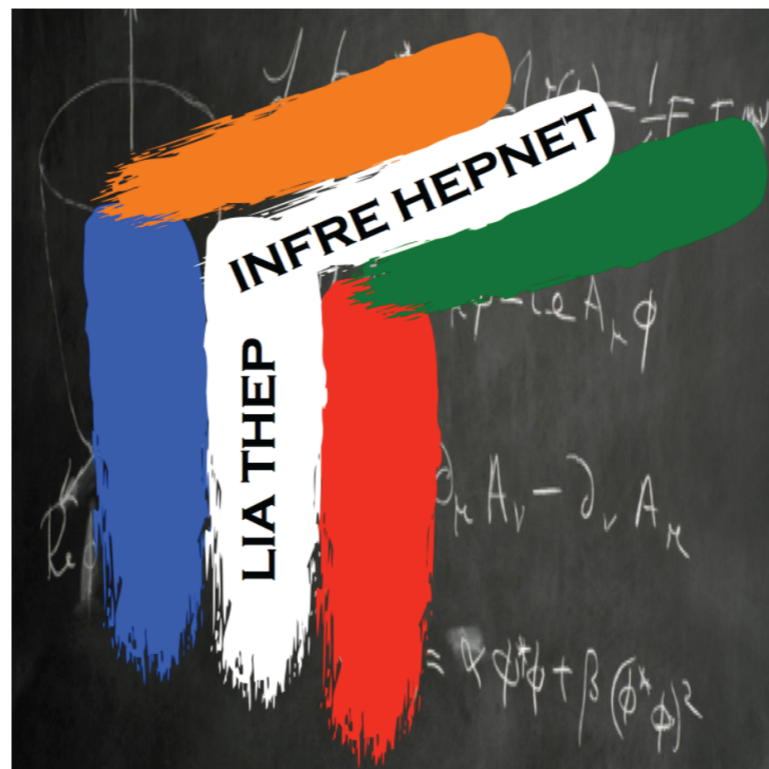


Second Meeting Indo-French HEP Collaboration

Introduction & Presentation
of the Network

Fawzi, Sudhir

IISER, PUNE, 26 FEB 2018



INDOFRENCH COLLABORATION
in
HIGH ENERGY PHYSICS



History

CEFIPRA Projects

- * Collider Physics, TIFR/LAPTh (ENS-LAPP), 1998-2001
- * Brane World Phenomenology, TIFR/CPT-X, 2003-2006
- * SUSY, Higgs and CP @ Colliders & in Astro, IISc/LPTOrsay, 2004-2008
- * Hot& Dense Matter in QCD, TIFR/SPhT-CEA, 2005-2007
- * Extreme QCD in the LHC era, TIFR/SPhT-CEA, 2011-201
- * Glimpses of New Physics, Saha Inst/CPT-X, 2016-2019
- * + *various collaborations, participation in WHEPP, Strings for LHC,...*
- * *exchange of students, post-docs in France (now back in India with permanent positions)*

In **2011**: CNRS INP asks to explore the possibility of a joint Indo-French Laboratory

LIA: Laboratoire International Associé

4 year project, budget from CNRS (INP), if in HEP then *theory*

Idea of a Network, with nodes,...

LIA France-Inde: Partenaires indiens

2012: rough proposal



Nœuds: 1) Bangalore-Chennai 2) TIFR, Mumbai 3) Allahabad-Delhi 4) Calcutta

Coordinatrice Inde: Rohini GODBOLE, CTS, IIS, Bangalore

dormant for sometime
until

LIA THEP

- ❖ Request from INP (CNRS) in Summer / Sep. 2014

- ❖ Kept the idea of the Network with 4 nodes in each country

- ❖ Phenomenology: Theorists only

- i) Physics of the Standard Model (SM) and beyond (BSM)*

- ❖ Approved Spring 2015

- ii) QCD/Quark Gluon Plasma*

- ❖ Budget came in late Summer 2015, 5keuros only

- ❖ 2016, 2017, 2018: 15KE/year



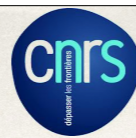
Indo-French Collaboration in Theoretical High Energy Physics

LIA THEP

Coordinators: F. Boudjema (LAPTh, Annecy, France) and R. Godbole (IISc, Bangalore, India)

November 7, 2014

LIA
THEP



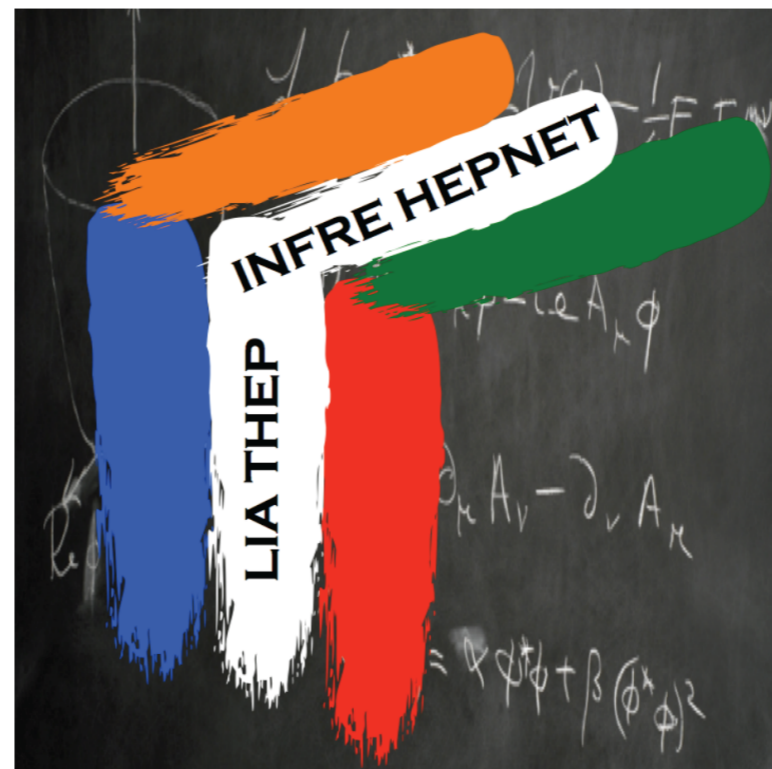
LIA (Laboratoire International Associé)
THEP (Theoretical High Energy Physics)
funded by the Institute of Physics of the
CNRS. This is a network of theoretical
physicists working in HEP in France and
India who have been a strong collaboration
since the early 1990's.

Coordinators: Fawzi & Rohini
Approved by CNRS: 2015
Budget 2015, 5k€
Budget 2016, 2017, **2018**: 15k€/year

Budget managed by LAPTh for both
France and India

Some flexibility in budget allocation

LAPTh will distribute funds to the nodes
(more later)



INDOFRENCH COLLABORATION
in
HIGH ENERGY PHYSICS



LIA members (Proposal)

France

LAPTh, Annecy/LPSC, Grenoble:

G. Bélanger, F. Boudjema, D. Guadagnoli, [J. Ph. Guillet](#), B. Herrmann and P. Serpico (LAPTh),
[S. Kraml](#) (LPSC)

IPNLyon

A. Arbey, G. Cacciapaglia, A. Deandrea, N. Mahmoudi

LPTOrsay/ CPhT Ecole Polytechnique

A. Djouadi, [U. Ellwanger](#), [A. Falkowski](#), [Y. Mambrini](#), G. Moreau (LPTOrsay), [E. Dudas](#) (CPhT)

IPhT, Saclay

[J.P. Blaizot](#), [F. Gelis](#), [E. Iancu](#), [J.Y. Ollitrault](#)

India

IISc (Bangalore) / IMSc (Chennai)

[R. Godbole](#), [S. Vempati*](#) (IISc), [S. Gopalakrishna](#) (IMSc)

TIFR, Mumbai

[Rajeev Bhalerao](#), [Rajiv Gvai](#), [Monoranjan Guchait](#), [Sourendu Gupta](#), [Sreerup Raychaudhuri](#),
[K. Sridhar](#)

HRI (Allahabad)/ Delhi Uni.

[B. Mukhopadhyaya](#) (HRI, Allahabad), [Debajyoti Choudhury](#), [Naveen Gaur](#) (Delhi U.)

SINP/ IACS/IISER, Kolkata

[Gautam Bhattacharyya](#) (SINP), [Dilip Ghosh](#) (IACS), [Ritesh K. Singh*](#) (IISER)

CEFIPRA (headquarters Delhi) INFRE-HEPNET

- ❖ At the same time we worked on another application: CEFIPRA
- ❖ Keep the same format & topics as LIA project
- ❖ **include experimentalists: CMS**




INDO-FRENCH HIGH IMPACT SCIENTIFIC RESEARCH NETWORK PROGRAMME
SUBMISSION OF FULL PROPOSAL

INFRE-HEPNET: INDO-FRENCH HIGH ENERGY PHYSICS NETWORK

CEFIPRA HEPNET

Coordinators: F. Boudjema (LAPTh, Annecy, France) and S. Vempati (IISc, Bangalore, India)

Requested Budget for the 3-year Project: 77 Lakhs (about 102 k€)
Network with about 50 physicists with permanent status plus students and post-docs

May 13, 2015



CEFIPRA

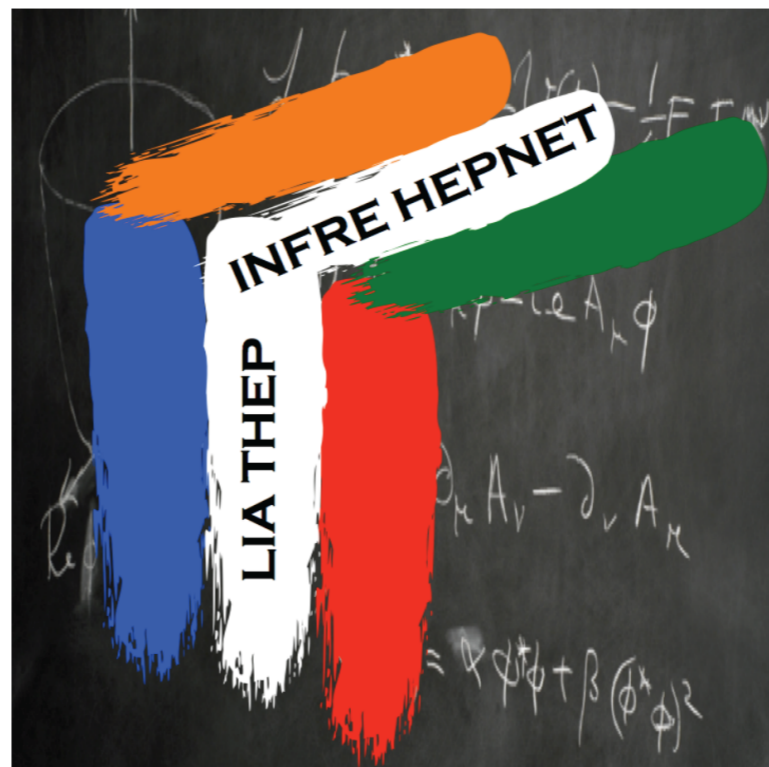
INFRE HEPNET

The INFRE-HEPNET
(IndoFrench Network on High
Energy Physics)

Coordinators: Sudhir & Fawzi

funded by CEFIPRA/IFCPAR
(Indo-French Centre for the
Promotion of Advanced
Research)

It includes all the theorists
involved in the LIA THEP as
well as Indian and French
experimentalists working in
CMS



INDOFRENCH COLLABORATION
in
HIGH ENERGY PHYSICS



Original Membership of CEFIPRA (Faculty)

India

Node IN1: IISc (Bangalore) / IISc (Chennai)

S. Vempati* [NetCo] (IISc), B. Bhattacharjee (IISc), S. Gopalakrishna (IISc)

Node IN2: TIFR (Mumbai) / IISER (Pune)

Rajeev Bhalerao, Rajiv Gavai, Monoranjan Guchait, Sourendu Gupta[NetCo], Sreerup Raychaudhuri, K. Sridhar, Gobinda Majumder(TIFR), Seema Sharma, Sourabh Dube (IISER)

Node IN3: HRI (Allahabad)/ Delhi Uni.

B. Mukhopadhyaya [NetCo] (HRI, Allahabad), Debajyoti Choudhury, Naveen Gaur (Delhi U.)

Node IN4: SINP/ IACS/IISER (Kolkata), NISER(Bhubaneswar)

Gautam Bhattacharya [NetCo] (SINP), Dilip Ghosh (IACS), Ritesh K. Singh* (IISER), Satyaki Bhattacharya (SINP), Prolay Mal* (NISER), Bedangadas Mohanty (NISER)

France

Node FR1: LAPTh, Annecy/LPSC, Grenoble:

G. Bélanger, F. Boudjema[NetCo], D. Guadagnoli, J. Ph. Guillet, B. Herrmann and P. Serpico (LAPTh), S. Kraml (LPSC)

Node FR2: IPNLyon

A. Arbey, G. Cacciapaglia, A. Deandrea[NetCo], N. Mahmoudi, S. Gascon-Shotkin, M. Gouzevitch, P. Verdier

Node FR3: LPTOrsay/ CPhT Ecole Polytechnique

A. Djouadi, U. Ellwanger, A. Falkowski, Y. Mambrini, G. Moreau (LPTOrsay), E. Dudas (CPhT)[NetCo]

Node FR4: IPhT/Irfu, Saclay

J.P. Blaizot, F. Gelis, E. Iancu, J.Y. Ollitrault[NetCo], M. Besançon, P. Gras, A. Zghiche

Broad topics

- * New Physics: Beyond the SM Physics at the LHC
 - * General and model independent approaches
 - * SUSY and SUSY-based analyses
 - * Extra dimensions
 - * Vector Quarks
- * Higgs in the SM and beyond
- * Dark Matter Studies: Dark Matter and the LHC

3.2 Budget and Spending

	# visits	# days/visit # days/visit	Allowance per day (in €)	Cost of flight average (in €)	Total cost of visits (in €)	Total cost of Visits (in INR)
Visits FR → IN	15	15	50	1000	26 250	19,68,750
Visits IN → FR	20	15	100	1000	50 000	37,50,000
Workshops/Schools	Average cost per event (in INR)	# Events			Total Cost (in €)	Total Cost in (in INR)
	5 Lakhs	4 (or 3 + 2 smaller ones, within the same overall 20Lakhs, with 2 events in France and 2 or 3 in India.)			26 667	20,00,000
Requested budget					Total in €	Total in INR
					102 917	77,18,750 (77.2Lakhs)

rate: 1 € = 75 INR



NB

- The requested budget from CEFIPRA (about 77.2 Lakhs INR) is within the 80 Lakhs set as a target by the Committee and the CEFIPRA Director. We have not accounted for the overheads since these were not communicated to us. In case these need to be accommodated as *per rules* within the 80 Lakhs INR limit, we could adapt the planning by reducing the number of visits or events.
- Note that we have counted 4 events to be organised over the 3-year period of the project, we may be over 5Lakhs INR limit per year allotted by CEFIPRA for this spending. We trust that the rules are flexible especially when it comes to a project where networking is important.
- We have made the budget on the assumption of an average of 15 days for each visit. Some participants, especially students, may require more days, we will work towards a balance. Final decisions on visits for a longer period will be made by the Steering Committee. In any case we will keep within the budget for each category (visits and events).
- It is to be noticed that we have made room for more visits for Indian colleagues to France than for visits to India. We will make up for this discrepancy by ear-marking more resources from the LIA IFTHEP for visits to India.
- The budget was made by having in mind the progress of our collaboration. We have planned to use up about 20% of the budget during Year 1 of the project and 40% of the budget for Year 2 and Year 3 each.
- As explained in few places in the document, we do not foresee to use CEFIPRA resources to cover visits and missions between the nodes within the same country. These will be covered by other national (or European) sources of funding.
- It may be observed that we provisioned an allowance for stays in India which is half that in France. It has been agreed that French visitors will be accommodated in the guest houses of the Indian campuses and institutions.
- No provision has been made for the purchase of special equipment or computers. The nature of the scientific collaboration does not require specific equipment. As concerns experiments, the project deals essentially with analyses rather than working on improving hardware (detectors,...). As for computers and office space these are covered by the budget of the partners.

UPDATE CEFIPRA
About 1 year (only) remaining

FR → IN : 9/15 so far. **6** visits remaining.

IN → FR : 8/20 so far. **13** visits remaining.

Budget allocated for two conferences :
INR 1,000,000 each.

May 2016 : Bangalore Kick-Off Meeting

Feb 2018: IISER, Pune

PROJECT NO. Network 2
APPROVED BUDGET FOR THE INDIAN RESEARCH PARTNERS

A. RECURRING EXPENSES

A1/ Indian Institute of Science, Bangalore (in Rs.)			
Details	1st Year	2nd year	3rd Year
1 Support for Scientific Interactive meeting	10,00,000	00	00
Year-wise total	10,00,000	00	00
Total approved budget on recurring expenses for the project duration			Rs.10,00,000

B. EXCHANGE VISITS INDIAN SIDE: (Travel will be managed by CEFIPRA on the basis of approved budget)

B1. / Indian Institute of Science, Bangalore (in Rs.)			
Duration of Visit	1 st year	2 nd year	3 rd year
5 visits of 15 days each during 1 st year, 10 visits of 15 days during 2 nd year and 5 visits of 15 days each during 3 rd year for Collaborators	1,82,699 X 5=9,13,495	1,82,699 X 10=18,26,990	1,82,699 X 5=9,13,495
Total	9,13,495	18,26,990	9,13,495
Approved budget for visits			36,53,980

YEARWISE TOTAL BUDGET FOR INDIAN SIDE (in Rs.)

Item	1 st year	2 nd year	3 rd year	Total
Recurring Expenses	10,00,000	00	00	10,00,000
Visits to France	9,13,495	18,26,990	9,13,495	36,53,980
Subtotal	19,13,495	18,26,990	9,13,495	46,53,980
Overhead Charges	00	00	00	00
YEAR WISE TOTAL	19,13,495	18,26,990	9,13,495	46,53,980
TOTAL APPROVED BUDGET				46,53,980

(Signature)
 (MATHEW JOSEPH)
 Accounts Officer
 Indo-French Centre for the
 Promotion of Advanced Research
 New Delhi

PROJECT NO. Network 2
APPROVED BUDGET FOR THE FRENCH COLLABORATOR

A. RECURRING EXPENSES

A2/ ILLAB, CNRS (in Euro)			
Details	1st Year	2nd Year	3rd Year
1 Support for Scientific Interactive meeting	00	14.286	00
2 Associated cost for dissemination of research and reports and creation of database, if necessary	00	00	00
Year-wise total	00	14.286	00
Total approved budget on recurring expenses for the project duration			Euro 14.286

B2 / EXCHANGE VISITS: (Travel will be managed by CEFIPRA on the basis of approved budget)

B2 / EXCHANGE VISITS (for 3 years) (in Euro)			
Duration of Visit	1 st year	2 nd year	3 rd year
Each year five visits of 15 days each during 1 st year, 2nd year and 3 rd year.	5 X 1.750= 8.750	5 X 1.750= 8.750	5 X 1.750= 8.750
Year wise Total	8.750	8.750	8.750
Total			26.250

YEARWISE TOTAL BUDGET FOR FRENCH SIDE (in Euro)

Item	1st year	2nd year	3rd year	Total
Recurring expenses	00	14.286	00	14.286
Visits to India	8.750	8.750	8.750	26.250
Subtotal excluding overhead charges	8.750	23.036	8.750	40.536
Overhead Charges	00	00	00	00
YEAR WISE TOTAL	8.750	23.036	8.750	40.536

(Signature)
 (MATHEW JOSEPH)
 Accounts Officer
 Indo-French Centre for the
 Promotion of Advanced Research
 New Delhi

LIA
THEP



The IndoFrench Network on HEP

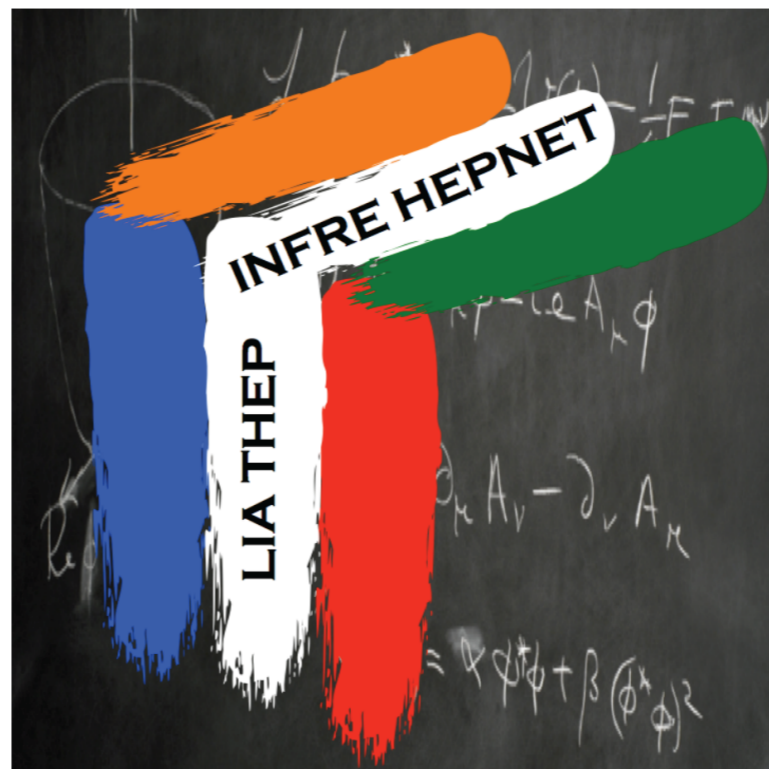


INFRE
HEPNET

<https://lapth.cnrs.fr/projects/ifthep/>



INDOFRENCH COLLABORATION
in
HIGH ENERGY PHYSICS



Budget Allocation and Distribution, Organisation

- * Extra funds from other grants
- * Travel within India / (some) accommodation taken care of by (some) institutes (see proposal / project)
- * Global management of funds (LIA+CEFIPRA), but we will keep an eye on the restrictions imposed by CEFIPRA (number of visits,..)
- * Allow for student exchanges,...
- * Allow for more experimentalists? ATLAS? (IN2P3). To be discussed here.
- * For LIA, LAPTh will distribute to other French labs. Important to plan right away.
Deadline:
- * Importance of the Application

Budget Distribution/Allocation (ex: 2017)

Expenditure, LIA IFTHP (in €)

Name	Lab./Node	Status	Dates of Visit	Host	Travel	Local Cost	Total
Giacomo Cacciapaglia [#]	IPN-Lyon	Senior	4-16/03	Delhi U.	693		693
Aldo Deandrea [#]	IPN Lyon	Senior	28/02-11/03	TIFR Mumbai	715		715
Biplob Bhattacharjee	IISc Bangalore	Senior	11-25/05	LAPTh Annecy	1183	1377	2560
Rajeev Bhalerao [#]	IISER Pune	Senior	05/06-08/07	IPhT Saclay	800	-	800
K. Sridhar [#]	TIFR Mumbai	Senior	14-28/06	IPN-Lyon	800	1620	2420
Kumar [*]	TIFR Mumbai	Student	15/09-07/10	LAPTh		2143	2143
P. Lamba [#]	IISc Bangalore	Student	01-15/10	LPT Orsay	800	1500	2300
Glenn Robbins	IPN Lyon	Student	27/11-15/12	TIFR Mumbai	594		594
Fawzi Boudjema	LAPTh Annecy	Senior	01-11/12	TIFR Mumbai	881		881
Emilian Dudas	Ecole Polytechnique	Senior	05-16/12	TIFR Mumbai	958		958

Total Expenditure (in €)

14 064**

Total Expenditure (in INR)

1 039 932

Visits funded by CEFIPRA

Name	Lab./Node	Status	Dates of Visit	Host
Susan Gascon-Shotkin	IPN Lyon	Senior	13-20/11 (2016)	TIFR Mumbai
Jean-Yves Ollitrault	IPhT Saclay	Senior	20/11-03/12 (2016)	TIFR Mumbai
Jean-Paul Blaizot	IPhT Saclay	Senior	9-26/01	TIFR Mumbai and IISER Pune
Fawzi Boudjema	LAPTh	Senior	28/03-12/04	HRI Allahabad and IISc Bangalore
Juhi Dutta	HRI Allahabad	Student	04/05-02/06	LPSc Grenoble
Charanjit Kaur	IISc Bangalore	Post-doc	02-17/06	LAPTh Annecy
Nabarun Chakrabarty	HRI Allahabad	Student	30/06-21/07	LAPTh Annecy
Ashwani Kushwaha	IISc Bangalore	Student	01-15/10	IPN Lyon
Jayita Lahiri	IISc Bangalore	Student	15-30/11	LPSC Grenoble

The total expenditure on the CEFIPRA budget amounts to about **16500 €**, slightly above the present expenditure on the LIA budget. Note that the real expenditure is much higher since the local travel and stay for French visitors in India is covered by the host laboratories and that for Indians visiting France longer than 2 weeks, the extra cost is covered by the French host (budget of the laboratory or various fellowships such Labex, ...)

Publications (more later)

- * So far 25 published / arXived papers from the Network
- * About 10 on-going projects which are about to be published
- * Please update / add your papers to the Wiki
- * Please acknowledge the LIA / CEFIPRA

The Network: number of registered members (20/02/2018)

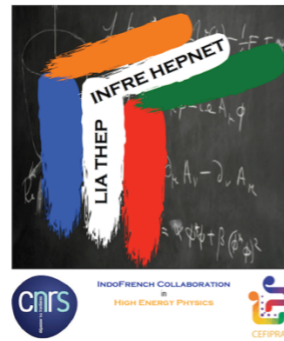
- * 40 FR
- * 56 IN (more students)
- * And a not negligible number of non registered people= people attending the Workshop but no account on the wiki/ not in the mailing list!

If not registered and registration approved

- No access to the wiki
- Newsletter
- Travel Funds / Visits

Application Form

1st Call for 2018 Open 20/02/2018
Deadline for application: 15/03/2018



Application for visits and travel

If you are visiting a partner laboratory, it is assumed that **you have already agreed with your dates of the visit(s)**. You must apply at least **two months prior** to the visit. Indeed, once the reviewed by the board of the LIA THEP (CNRS) and INFRE HEPNET (CEFIPRA) we need to contact CEFIPRA office in Delhi that will be in charge of purchasing the plane ticket and/or the CNRS for initiating the mission.

Name of the applicant:

Home Institution:

Status: Faculty or equivalent/Post-doc/Student

Host Institution(s) (if visiting more than one):

Collaborator(s):

Purpose of the visit (brief summary of the collaboration)

-Topic (a few lines will suffice)

-History of the collaboration if any

(Rough) Estimate of the costs (see [Nota Bene](#) below)

Dates of the visit

[Inset Dates, number of days with host(s)]

If you are visiting more than one institute give the different dates for each institute.

Itinerary & Estimated cost of travel

- Plane (including airport transit...)

Partial or full cover

In order to be able to fulfill a maximum of requests you should find out whether your trip/visit can be covered, even partially, by some other means (grants, trip covered by an institute outside the Network, etc.). Are you requesting

Full cover: yes/no

Or cover for

- Travel: yes/no
- Full Stay: yes/no
- Number of days to cover by LIA/CEFIPRA in case part of the stay is covered by the host, the home institution, other grant (specify): [insert number of days]

Any other information you want to share

Send application to: hep-indofrench@laph.cnr.fr **with a copy to the host**

NB

When setting up the programme all Indian Institutes taking part in the project agreed that, for visits to India, local expenses and travel will be covered by the host institutes in India.

In case of a visit to more than one host institute in France, the programme will not cover the cost of travel between the host institutes in France. Provision should be made for this cost (it should be taken care of by one of the institutes for example...).

Can you become a member?
How to become a member?

Must be Faculty / Student / Post-doc
Of
One of the Laboratory of the Network (signatories of the "Agreement")

Good Practice: Wiki add members/WG

First Check the public page (can not edit this page but..)

Trace: - pre-regitration_of_new_members_processed - pre-regitration_of_new_members - publications - **members_restricted**

members_restricted

- Main
- Members
 - List of participants
 - Mailing Lists (Restricted)
- Meetings and Workshops
 - 25-28 Feb 2018 the Pune Meeting
 - Sandbox for Pune
 - Kick-off Meeting, May 2016
- Working Groups
 - Higgs and other scalars
 - Naturalness and Fine-tuning
 - Dark Matter
 - Extra-dimensions
 - Heavy Objects
 - Tools and Recasting
 - Model Building and Phenomenology
 - QGP, Extreme QCD
 - CMS Working Group
- Visits
 - Application form (restricted)
- Publications
 - Work in Progress (restricted)
- Documents (Restricted)
 - Work Packages/Planning
 - LIA
 - 2017 Progress Report
 - 2016 Progress Report
 - 2015 Progress Report
 - 2015 Proposal
 - Agreement document, signatories
 - CEFIPRA
 - 2017 Progress Report
 - 2016 Progress Report
 - 2015 Proposal
 - 2015 Notification
- Related Workshops
 - Raman-Charpak 2016
- News
 - kick-off meeting in the news

Members

For any changes/corrections/additions (students, post-docs, new faculty) please [send a mail to the board](#) with a copy to your **node coordinator** (NC).

You must also ask a colleague of your node who is a member to pre-register you [here](#) (members access only).

France

Name	Institute	Email	Collaboration/Project	Position	Node
Fawzi Boudjema (NC)	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Geneviève Bélanger	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Cédric Delaunay	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Diego Guadagnoli	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Jean-Philippe Guillet	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Björn Herrmann	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Pasquale Serpico	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Emanuele Re	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble
Bryan Zaldivar	LAPTh, Annecy	email	LIA THEP, CEFIPRA	Post-doc	Annecy/Grenoble
Jordan Bernigaud	LAPTh, Annecy	email	LIA THEP, CEFIPRA	PhD Student	Annecy/Grenoble
Sabine Kraml	LPSC,	email	LIA THEP, CEFIPRA	Senior	Annecy/Grenoble

- Members
 - List of participants
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 - kick-off meeting in the news
- Sitemap
- Menu

Pre-Registration of New Members and Deregistration

For any changes/corrections/additions (students, post-docs, new faculty) please notify the Network coordinators [send a mail to the board](#) as well as the coordinator of the node the new member belongs to.

Deregistration [Go here](#)

New Registration For a new registration, we first need the approval of the node coordinator before giving the new member access to the wiki. Once this is done, the member will have access. For the new member to be able to apply for funds, the board will first have to notify the CEFIPRA office.

In the meantime please enter the following information (for a new Faculty/Senior leave the box Supervisor, Sup.v, blank)

MMA stands for the (already registered) member making the pre-registration for a potential futur member.

AppCoo stands for "approved by the coordinator", can only be filled by the coordinators

AppCEF stands for approved by CEFIPRA", can only be filled by the Network coordinator after CEFIPRA gives its approval.

p: pending

Page can be edited by a member

Registration of new Faculty/Researcher with permanent status A CV must be provided. The CV is required by CEFIPRA. Upload the CV in pdf format (call it Name_FirstName.pdf), [here](#)

France

Name	Institute	Email	Project	Position	Sup.v	MMA	Node	AppCoo	AppCEF
FirstName Surname	Lab, Town	✉ email	CEFIPRA	Senior		Master Chef	Lyon	p	p

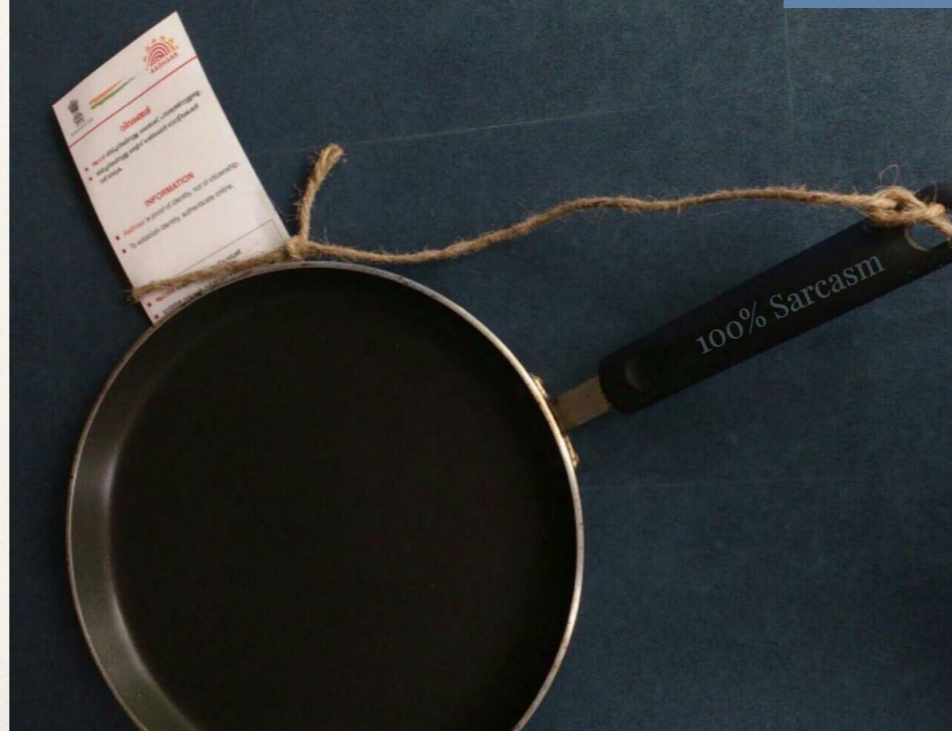
India

Name	Institute	Email	Project	Position	Sup.v	MMA	Node	AppCoo	AppC
FirstName Surname	Lab, Town	✉ email	LIA, CEFIPRA	Student	Supervisor	Master Chef	Bombay	p	p

Processed applications are [here](#)

I have linked AADHAR to my PAN

and IndoFrench Wiki



- Working Groups
 - Higgs and other scalars
 - Naturalness and Fine-tuning
 - Dark Matter
 - Extra-dimensions
 - Heavy Objects
 - Tools and Recasting
 - Model Building and Phenomenology
 - QGP, Extreme QCD
 - CMS Working Group

Re-Organisation of the Working Groups ?

9 Working Groups, set up during the kick-off meeting, Bangalore May 2016

▪ [Higgs and other scalars](#) , Convener: Adam Falkowski, Signed in members: 11

▪ [Naturalness and Fine-tuning](#), Aldo Deandra, Signed in members: 5

▪ [Dark Matter](#), Fawzi Boudjema (11)

▪ [Extra-dimensions](#) K. Sridhar (5)

▪ [Heavy Objects](#) (includes top physics, boosted stuff, jets): Tuhin Roy (6)

▪ [Tools and Recasting](#): Sabine Kraml and Biblop (3)

▪ [Model Building and Phenomenology](#) Emilian Dudas (5)

▪ [QGP, Extreme QCD](#) Jean-Yves Ollitrault (10)

▪ [CMS Working Group](#) Suzanne Gascon-Shotkin and Seema Sharma (5)

* As of 20/02/2018. Number of members not a sign of a dormant/active WG

❖ Contrast this WG Categorisation with Action Plan

2.7 Action Plan, Working Packages, Milestones and Timeline

Nodes	WP, Objectives	Activities	Milestones	Timeline
All nodes	Higgs in the SM and beyond	SM decays and production, spin, asymmetries	Fits task force. Proposals for increased sensitivity to deviations from the SM. Anomalous and higher order operators	Y1-Y3
		$t\bar{t}H$ coupling: $t\bar{t}H, H + j$ cross sections	Nature of the $t\bar{t}H$ coupling. Full simulations, CP observables	Y1-Y2
		Rare and Invisible decays	Impact on DM. Flavour connection	Y1-Y3
		Extra Higgs searches	Set Limits. Impact on new models	Y2
		Reassessment of fine tuning	What is naturalness? Impact on BMSSM. String connection	Y3 Y2
All nodes	Beyond the SM at the LHC	Model independent analyses, recasting	New Limits Public Database of NP searches	Y1/Y2 Y2,Y3
		Use of spin technique/polarisation, M_{T2}	Combine these for spin reconstruction	Y2
		Non minimal SUSY, Extra-dim with extra jets	New limits. New search techniques	Y1-Y3
		Vector Quarks, V_Q	Novel signatures of V_Q at LHC	Y1, Y2
		Development of tools (SModelS/XCAT/MadAnalysis)	Merging and interfacing	Y1-Y2
		Flavour and CP violation in SUSY	Provide a new tool	Y2
All nodes	Dark matter	Monojets and Monophotons	Improve techniques. New limits on DM Direct Detection vs LHC: Benchmarking	Y1 Y2
		LHC analyses and synergy LHC/Astro	If signal, reconstruct model If null result impact on future searches	Y3 Y3
		Baryogenesis and Dark Matter, Models of Inflation	Work out the Higgs connection. H^3 coupling	Y2-Y3
IN2, FR4 IN4	Understanding the QGP	New signatures of collective flow	Principal component analysis: higher-order correlations.	Y1
		Thermalization in heavy-ion collisions	First principles vs relativistic fluid dynamics	Y2, Y3
		Jets in medium	Emergent phenomena in N-N collisions	Y1,Y2
		Quarkonium	Lattice simulations vs Langevin equation	Y3

NB

There can be a lot of **overlap** between some activities. Techniques developed in some activities can be used for other applications, for instance use of M_{T2} , azimuthal angle approach for simple identification can make it into simulation tools which in turn have a bearing on extracting new limits or discover new particles. As argued in the scientific programme, there are also overlaps between work packages. It goes without saying that this planning and milestone should be adapted quickly if a new particle or phenomena is discovered. For the first 3 WP all nodes are taking part but not necessarily in all activities of the WP (see Chapter 2 for details.)

Deliverables: All our *deliverables* are in the form of articles in high impact journals and or providing new tools to the community.

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CMS/Exp WG across border, with specific (internal CMS) meetings?

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2017 Publications (and WG)

2017	Authors	Title	arXiv/Download	Journal	Laboratories
Higgs/DM	Barman, Bélanger, Bhattacharjee, Godbole, Mendiratta, Sengupta	The invisible decay of Higgs boson in the context of a thermal and non-thermal relic in MSSM	1703.03838	Phys. Rev. D95(9):095018, 2017	IISc, LAPTh
QGP	JP Blaizot, Li Yan	Onset of hydrodynamics for a quark-gluon plasma from the evolution of moments of distribution functions	1703.10694	10.1007/JHEP11(2017)161	IPhT, Saclay
Higgs/DM	Banerjee, Barducci, Bélanger, Fuks, Goudelis, Zaldivar	Cornering pseudoscalar-mediated dark matter with the LHC and cosmology	1705.02327	10.1007/JHEP07(2017)080	LAPTh, LPTHE
Heavy Objects	Banerjee, Bélanger, Bhattacharjee, Boudjema, Godbole, Mukherjee	Novel signatures for long-lived particles at the LHC	1706.07407		LAPTh, IISc
Higgs	Amit Adhikary, Shankha Banerjee, Rahool Kumar Barman, Biplob Bhattacharjee, Saurabh Niyogi	Revisiting the non-resonant Higgs pair production at the HL-LHC	1712.05346		LAPTh, IISc
Higgs Scalars / CMS	CMS Collaboration	Search for new resonances in the diphoton final state in the mass range between 70 and 110 GeV in pp collisions at $\sqrt{s}=8$ and 13 TeV	CMS-PAS-HIG-17-013		IPNLyon, SINP Kolkata
Higgs/ExtraDim	Mahmoudi, F. and Manglani, N. and Sridhar, K.	The bulk Higgs in the Deformed RS Model	1712.04966		TIFR Mumbai, IPNLyon
QGP	Chattopadhyay, Chandrodoy and Bhalerao, Rajeev S. and Ollitrault, Jean-Yves and Pal, Subrata	Effects of initial-state dynamics on collective flow within a coupled transport and viscous hydrodynamic approach	1710.03050		TIFR Mumbai, IISER Pune, IphT Saclay
Model Building Pheno	Deandrea, Iyer	Vector-like quarks and heavy coloured bosons at the LHC	1710.01515		IPNLyon, TIFR Mumbai
Higgs / Fine Tuning	Banerjee A, Bhattacharyya G, Ray TS	Improving Fine-tuning in Composite Higgs Models	1703.08011	Phys.Rev. D96 (2017) no.3, 035040	SINP, Kolkata

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Model Building Pheno

Tools-Recasting

DM WG

QGP WG

Heavy Objects

CMS/Exp WG across border, with specific (internal CMS) meetings?

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New Topics?

Heavy Objects

(Very) Light Objects / v. Weakly coupled: High Intensity Frontier
(non thermal DM,..)

Precise Calculations, Radiative Corrections

New Topics. New Directions. New WGs??

Heavy Objects/ Jetology: see lectures and interest later

(Very) Light Objects / v. Weakly coupled: High Intensity Frontier
(non thermal DM,..)

Precise Calculations, Radiative see lectures and interest later

CMS WG / CEFIPRA vs LIA-CNRS

CMS/Exp WG across border, with specific (internal CMS) meetings?

Very strong recommendation made by CEFIPRA during the annual report given by Sudhir: much stronger collaboration between TH and EXP

- * Since the network is unique that it has both theorists and experimentalists, is there is a strong collaboration between the two groups ?
- * A possibility of "report" has been mentioned.

If CEFIPRA not renewed the Network will continue without experimentalists funded by CNRS (INP), despite the fact that more and more experimentalists (specially from India) are taking part. Convince IN2P3?

Could be nice to find a common
project leading to report from the
Network

Work

- ❖ Working Group(s): Please add your name to the WGs you are/might contribute to here in Pune
- ❖ In your WG discuss whether the WG should be merged,...

Should we ask for a renewal/
extension???
