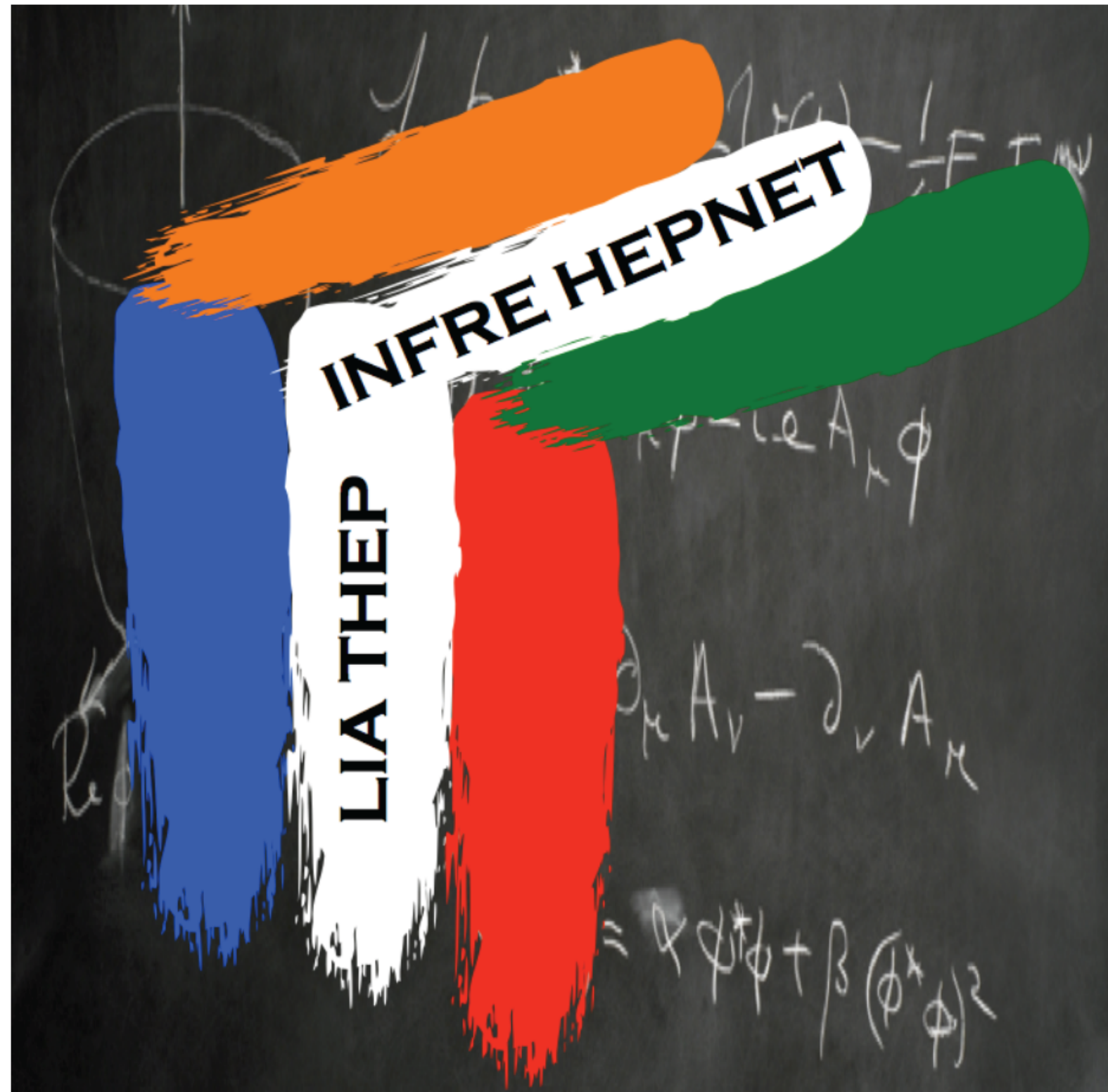


# Kick-off Meeting Indo-French HEP Collaboration

## Introduction & Presentation of the Network

*Fawzi, Rohini, Sudhir*

*Bangalore, 2 May 2016*



**INDOFRENCH COLLABORATION**  
in  
**HIGH ENERGY PHYSICS**

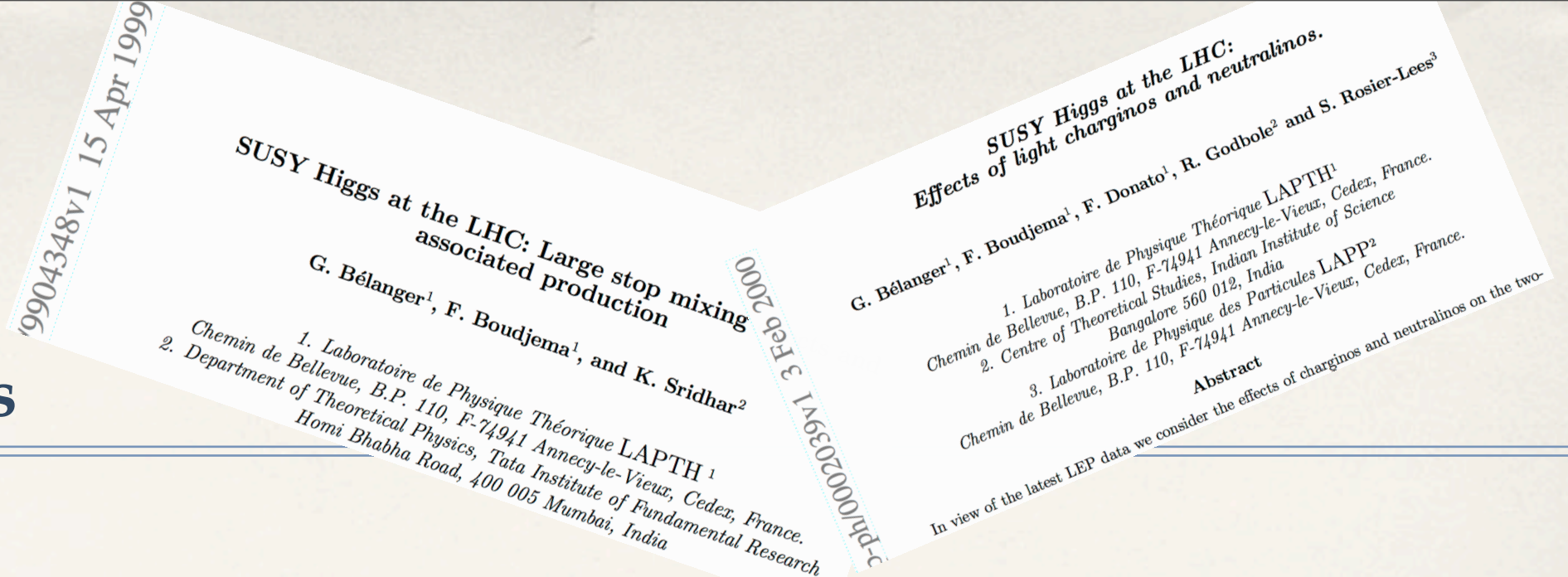




# History

## 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

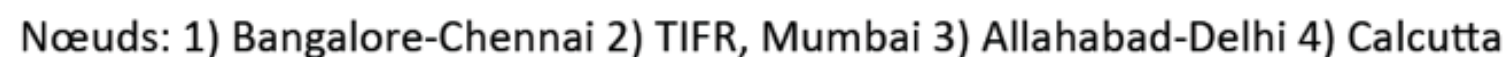
LIA: Laboratoire International Associé

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

*Idea of a Network, with nodes,...*



## 2012: rough proposal



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
- \* while administrative “talks”, signatures, Intellectual Property Rights,.. were going on



LIA France India

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 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<sup>\*</sup> (IISc), S. Gopalakrishna (IMSc)

### TIFR, Mumbai

Rajeev Bhalerao, Rajiv Gai, 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<sup>\*</sup> (IISER)

## France

### Node 1 : LAPTh, Annecy

#### Permanent Staff

G. Bélanger, DR1, 30%  
F. Boudjema, DR1, 50%  
J. Ph. Guillet, DR1, 30%  
B. Herrmann, MCF, 20%  
E. Re, CR1, 10%  
P. Serpico, CR1, 10%

#### Non permanent

S. Banerjee, Post-doc, 80%  
D. Barducci, Post-doc, 20%  
C. Delaunay, Post-doc, 20%  
B. Zaldivar, Post-doc, 20%

### Node 2 : IPNL, Lyon

#### Permanent Staff

G. Cacciapaglia, CR1, 10%  
A. Deandrea, PR1, 30%

#### Non permanent

M. Lespinnasse, Ph.D, 15%  
S. Le Corre, Ph.D, 20%

### Node 3 : LPT, Orsay

#### Permanent Staff

A. Djouadi, DR1, 10%  
U. Ellwanger, PR1, 30%  
A. Falkowski, CR1, 20%  
Y. Mambrini, CR1, 30%  
G. Moreau, MCF, 30%

#### Non permanent

H. Belusca-Maito, Ph. D, 20%  
K. Mimouni, Ph. D, 20%  
M. Rodriguez, Ph. D, 20%  
A. Angelescu, Ph. D, 20%  
M. Pierre, Ph. D, 20%  
F. Giachino, PhD, 20%  
Subhadip Mitra, Post-doc, 20%  
Pradipta Ghosh, Post-doc, 20%

### Node 4 : IPhT, Saclay

#### Permanent Staff

F. Gelis, E5, 5%  
J.Y. Ollitrault, DR1, 10%,

#### Non permanent

J.P. Blaizot, DRCE, 20%

## India

### Node 1 : IISc, Bangalore

#### Permanent Staff

R. Godbole, Prof., 50%  
S. Vempati, Ass. Prof., 25%

### Node 2 : TIFR, Mumbai

#### Permanent Staff

Rajeev Bhalerao, Prof., 50%  
Rajiv Gavai, Senior Prof., 10%  
Monoranjan Guchait, Ass. Prof., 30%  
Sourendu Gupta, Senior Prof., 20%  
Sreerup Raychaudhuri, Prof. (H), 20%  
K. Sridhar, Prof., 30%

#### Non permanent

Abishek Iyer, Post-doc, 20%  
Amit Chakraborty, Post-doc, 20%  
Ms. Ushoshi Maitra, Post-doc, 20%  
Namrata Manglani, Ph.D, 20%  
Debjyoti Bardhan, Ph.D, 20%  
Tousik Samui, Ph.D, 20%  
Disha Bhatia, Ph.D, 20%

### Node 3 : HRI, Allahabad

#### Permanent Staff

B. Mukhopadhyaya, Prof., 30%  
Aseshkrishna Datta, Prof.  
Santosh Kumar Rai, Ass. Prof.

#### Non permanent

Pratishruti Saha, Post-doc, 20%  
Subhadeep Mandal, Post-doc, 20%  
Nabarun Chakrabarty, Ph.D, 20%  
Siddharth Dwivedi, Ph.D, 20%  
Kashi Nath das, Ph.D, 20%  
Jyotiranjana Beuria, Ph.D, 20%  
Juhi Dutta, Ph.D, 20%

### Node 4 : SINP, Kolkata

#### Permanent Staff

Gautam Bhattacharyya, Prof., 30%



# ANNEX 3: COMPOSITION OF THE LABORATORIES / TEAMS AT 1 JANUARY 2016

## France

### Node 1 : LAPTh, Annecy

#### Permanent Staff

G. Bélanger, DR1, 30%  
 F. Boudjema, DR1, 50%  
 J. Ph. Guillet, DR1, 30%  
 B. Herrmann, MCF, 20%  
 E. Re, CR1, 10%  
 P. Serpico, CR1, 10%  
 Non permanent  
 S. Banerjee, Post-doc, 80%  
 D. Barducci, Post-doc, 20%  
 C. Delaunay, Post-doc, 20%  
 B. Zaldivar, Post-doc, 20%

### Node 2 : IPNL, Lyon

#### Permanent Staff

A. Arbey, MCF, 20%  
 G. Cacciapaglia, CR1, 10%  
 A. Deandrea, PR1, 30%  
 N. Mahmoudi, MCF, 20%

#### Non permanent

G. Robbins, Ph.D, 20%  
 M. I  
 S. L

## India

### Node 1 : IISc, Bangalore

#### Permanent Staff

R. Godbole, Prof., 50%  
 S. Vempati, Ass. Prof., 25%

### Node 2 : TIFR, Mumbai

#### Permanent Staff

Rajeev Bhalerao, Prof., 50%  
 Rajiv Gavai, Senior Prof., 10%  
 Monoranjan Guchait, Ass. Prof., 30%  
 Sourendu Gupta, Senior Prof., 20%  
 Sreerup Raychaudhuri, Prof. (H), 20%  
 K. Sridhar, Prof., 30%

#### Non permanent

Abishek Iyer, Post-doc, 20%  
 Amit Chakraborty, Post-doc, 20%  
 Ms. Ushoshi Maitra, Post-doc, 20%  
 Namrata Manglani, Ph.D, 20%  
 Debjyoti Bardhan, Ph.D, 20%  
 Tousik Samui, Ph.D, 20%  
 Disha Bhatia, Ph.D, 20%

### Node 3 : HRI, Allahabad

## Other Participants attached to the nodes

## France

### Node 1

#### Per

#### A. E

#### U. F

#### A. F

#### Y. M

#### G. M

#### Non

#### H. F

#### K. M

#### M. I

#### A. A

#### M. I

#### F. G

#### Sub

#### Pra

### LPSC, Grenoble (Node 1)

Permanent Staff : S. Kraml, DR2, 20%

Non permanent : Dipan Sengupta, Post-doc, 30% ; U. Laa, Ph. D, 20%

### CPhT, Palaiseau (Node 3)

Permanent Staff : E. Dudas, DR1, 10%

Non permanent : P. Ghosh, Post-doc, 20%

## India

### IMSc, Chennai (Node 1)

Permanent Staff : S. Gopalakrishna, Reader -F, 30%

Non permanent : Saurabh Niyogi, Ph.D, 20%

### Delhi Uni., Delhi (Node 3)

Permanent Staff : Debajyoti Choudhury, Prof., 30% ; Naveen Gaur, Ass. Prof., 50%

Non permanent : Sumit Mamoria, Ph.D Student, 20%

Divya Sachdeva, Ph.D Student, 20%

### IACS, Kolkata (Node 4)

Permanent Staff : Dilip Ghosh, Prof., 40%

Non permanent : Nivedita Ghosh, Ph.D, 20%

### IISER, Kolkata (Node 4)

Permanent Staff : Ritesh K. Singh, Ass. Prof., 40%

Non permanent : Subrata Khan, Post-doc, 20%; Rafiqul Rahaman, Ph. D, 20%

### Node 4 : IPhT, Saclay

#### Permanent Staff

J.P. Blaizot, DRCE, 20%  
 F. Gelis, E5, 5%  
 J.Y. Ollitrault, DR1, 10%,



# Broad topics

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- ✧ 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



LIA (Laboratoire International Associé)  
THEP (Theoretical High Energy Physics)  
funded by the Institute of Physics of the  
CNRS. This 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

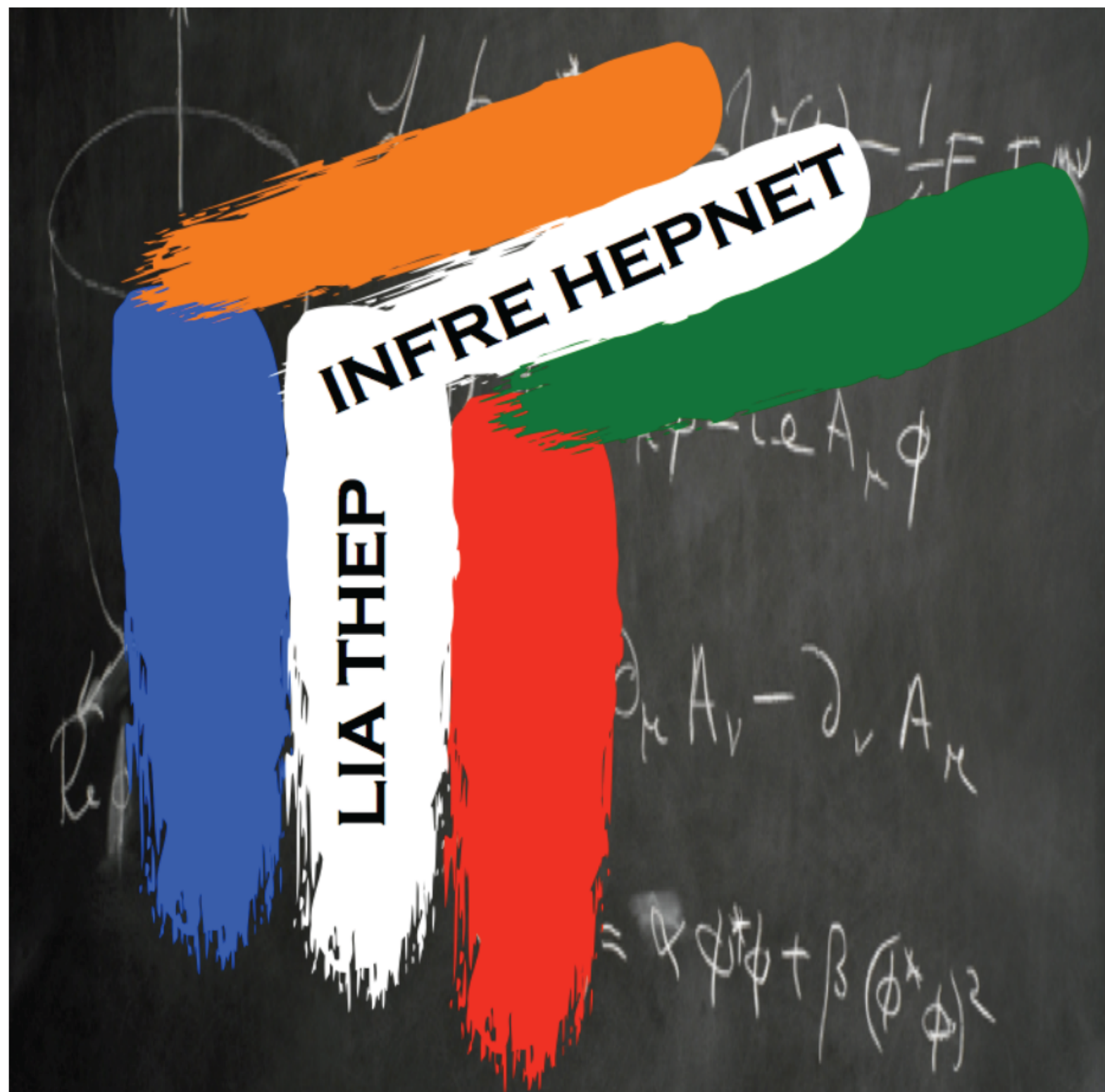
Budget 2015, 5kE

Budget 2016, 15kE/year

Budget managed by LAPTh for both  
France and India

Some flexibility in budget allocation

LAPTh will distribute funds to the nodes  
(more later)





# CEFIPRA (headquarters Delhi) INFRE-HEPNET

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- ❖ 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

## India

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

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

### 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 Ma\* (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



# France

NetCo: Node Coordinator  
PrCo: Principal/Country Coordinator

First Name and Surname	Institute
Fawzi Boudjema PrCo, NetCo	LAPTh
Genevive Bélanger	LAPTh
Diego Guadagnoli	LAPTh
Jean-Philippe Guillet	LAPTh
Björn Herrmann	LAPTh
Pasquale Serpico	LAPTh
Sabine Kraml	LPSc
Emilian Dudas NetCo	CPhT
Ulrich Ellwanger	LPTO
Abdelhak Djouadi	LPTO
Grégory Moreau	LPTO
Adam Falkowski	LPTO
Yann Mambrini	LPTO
Aldo Deandra NetCo	IPN Lyon
Nazila Mahmoudi	IPN Lyon
Giacomo Cacciapaglia	IPN Lyon
Alexandre Arbey	IPN Lyon
Susan Shotkin-Gascon	IPN Lyon
Patrice Verdier	IPN Lyon
Maxime Gouzevitch	IPN Lyon
Jean-Yves Ollitrault NetCo	IPhT, Saclay
François Gélis	IPhT, Saclay
Edmond Iancu	IPhT, Saclay
Jean-Paul Blaizot	IPhT, Saclay
Philippe Gras	Irfu, Saclay
Marc Besançon	Irfu, Saclay
Amina Zghiche	Irfu, Saclay



# India

First Name and Surname	Institute
Sudhir K. Vempati PrCo, NetCo	IISc
B. Bhattacharjee	IISc
S. Gopalakrishna	IMSc
R. Bhalerao	TIFR
Rajiv Gavai	TIFR
Monoranjan Guchait	TIFR
Sourendu Gupta NetCo	TIFR
Sreerup Raychaudhuri	TIFR
K. Sridhar	TIFR
Seema Sarma	IISER, Pune
Sourabh Dube	IISER, Pune
Gobinda Majumder	TIFR
B. Mukhopadhyaya NetCo	HRI
D. Choudhury	Delhi Univ.
Gautam Bhattacharyya NetCo	SINP
Dilip Ghosh	IACS
Ritesh K Singh	IISER, Kolkata
Satyaki Bhattacharya	SINP
Prolay Mal	NISER
Bedangadas Mohanty	NISER



## 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						

- 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 IFTHPEP 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.



NB



# CEFIPRA Proposal

## Visits

Year	Visit	# of Visits	days/ per visit	Allowance/ day  (in Euros)	Cost of flight / average (in Euros)	Total Cost of Visits  (in Euros)	Total Cost of Visits  (in INR)
<b>1st Year</b>	IN -> FN	5	15	100	1000	12500	937500
	FN -> IN	5	15	50	1000	8750	656250
<b>2nd Year</b>	IN->FN	10	15	100	1000	25000	1875000
	FN-> IN	5	15	50	1000	8750	656250
<b>3rd Year</b>	IN-> FN	5	15	100	1000	12500	937500
	FN -> IN	5	15	50	1000	8750	656250

Year	Probable Location and Time	Accommodation (Guest Houses, Hotels etc..)	Travel within India/ France	Conference material, secretarial help, Food , Hall booking	Expected Budget of Workshop in Euros	Expected Budget of Workshop in INR
First Year	Bangalore, April/May 2016	INR 3,50,000	INR 3,50,000	INR 3,00,000		10,00,000
Second Year	India 2017					10,00,000
Third Year	India 2018					10,00,000
Second Year	France :2017				14286	
Third Year	France 2018				14286	
Total					28572	30,00,000



**Dr. Debapriya Dutta**  
Director

**No. IFC/Network 2 /  
27<sup>th</sup> July, 2015**

Dear Prof. Vempati,

**Sub: Proposal “Indo-French High Energy Physics Network”-reg**

It is my pleasure to inform you that the project proposal **“Indo-French High Energy Physics Network”** submitted by you and Prof. Fawzi BOUDJEMA, Laboratoire d’Annecy-le Vieux de Physique Théorique, CNRS under Network programme of CEFIPRA has been recommended by Scientific Council of CEFIPRA for support with following budgetary recommendation.

**Indian side:**

Travel for Researchers (20 Visits): Rs. 37, 50,000/-

Support for scientific Interactive meeting (One per year): Rs.10, 00,000/ **In total**

**French side:**

Travel for Researcher (15 visits): Euro 26.250

Support for scientific Interactive meeting (One in 2<sup>nd</sup> year and one in 3<sup>rd</sup> year): Euro 14.286 **In total**



10 Lakhs only  
Year 1 for  
Meetings

**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
<b>Year-wise total</b>		<b>10,00,000</b>	<b>00</b>	<b>00</b>
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.)**

Number of Exchange Visits (for 3 years)		Daily allowance @ Euro 100 per day includes accommodation and other charges also and Air ticket Euro 1000 per person. ( Exchange rate 1 Euro = 73.0796)		
Duration of Visit		1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year
5 visits of 15 days each during 1 <sup>st</sup> year, 10 visits of 15 days during 2 <sup>nd</sup> year and 5 visits of 15 days each during 3 <sup>rd</sup> 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
<b>Total</b>		<b>9,13,495</b>	<b>18,26,990</b>	<b>9,13,495</b>
<b>Approved budget for visits</b>		<b>36,53,980</b> ✓		

**YEARWISE TOTAL BUDGET FOR INDIAN SIDE**

**(in Rs.)**

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



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



**A2/ LAPTh, 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
	<b>Year-wise total</b>	<b>00</b>	<b>14.286</b>	<b>00</b>
Total approved budget on recurring expenses for the project duration		<b>Euro 14.286</b>		

**Only one Meeting : Next Year!  
(Les Houches!)??**

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

Number of Exchange Visits (for 3 years)			Daily allowance @ Euro 50 per day includes accommodation and other charges also and Air ticket Euro 1000 per person.
Duration of Visit	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year
Each year five visits of 15 days each during 1 <sup>st</sup> year, 2 <sup>nd</sup>	5 X 1.750 = 8.750	5 X 1.750 = 8.750	5 X 1.750 = 8.750



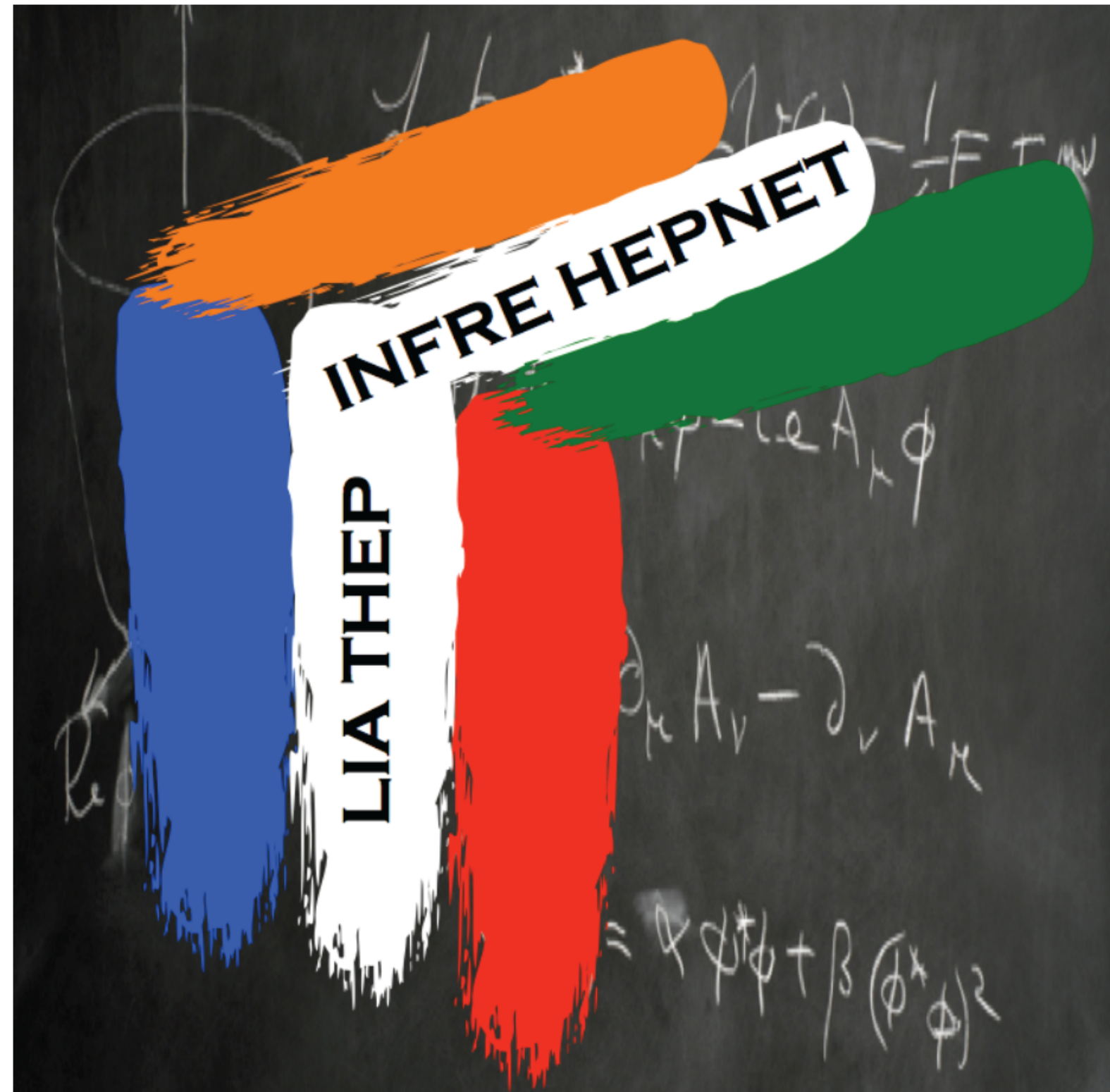


# INFRE HEPNET

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

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

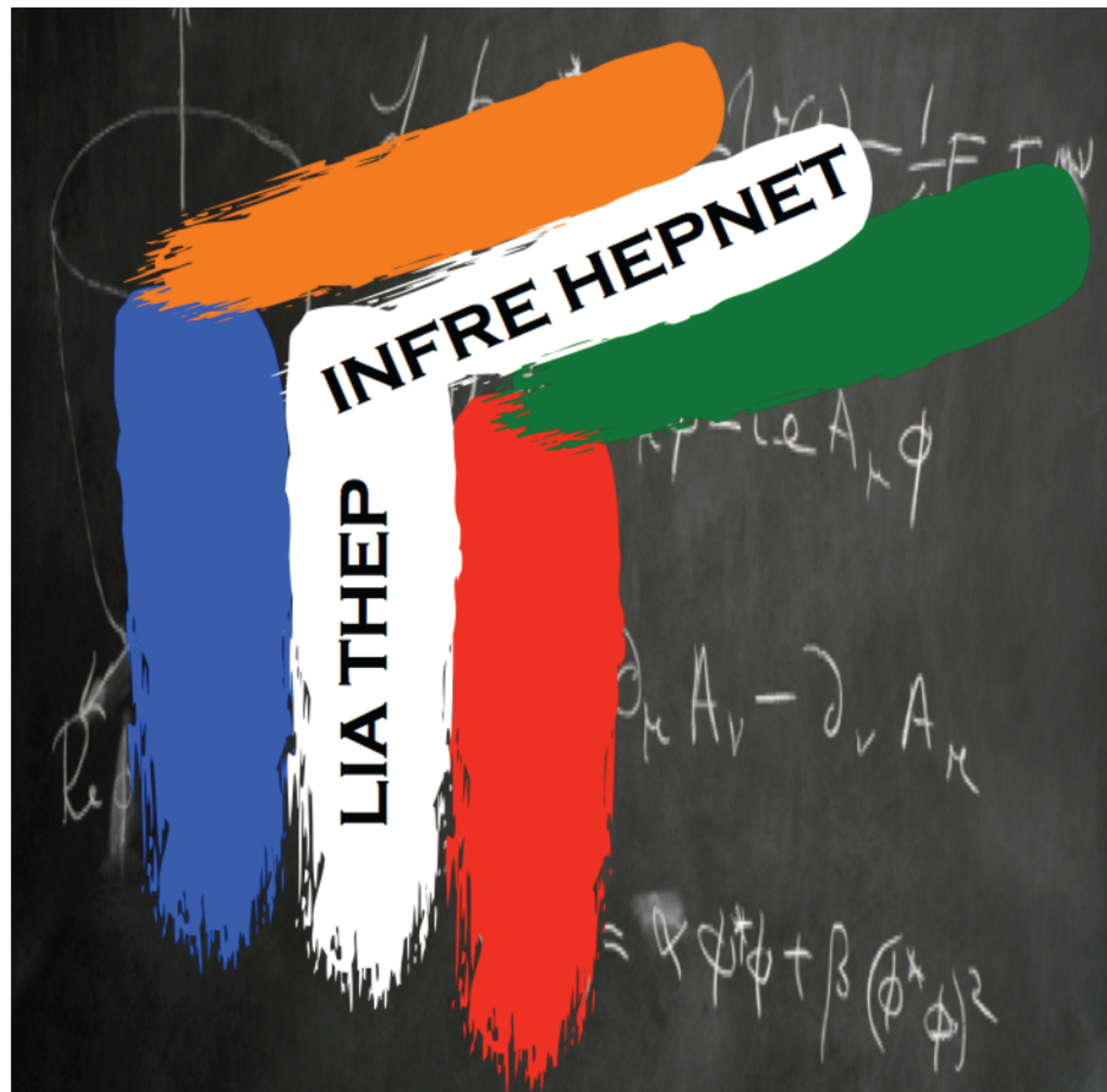




LIA  
THEP



INFRE  
HEPNET



INDO FRENCH COLLABORATION  
in  
HIGH ENERGY PHYSICS





# Budget Allocation and Distribution, Organisation

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- ❖ 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



# Application Form



## Application for visits and travel

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

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 fulfil a maximum of requests you should find out whether you are already covered, even partially, by some other means (grants, trip covered by an institution, 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 your home institution, other grant (specify): [insert number of days]

**Any other information you want to share**

**Send application to:** [hep-indofrench@lapth.cnrs.fr](mailto:hep-indofrench@lapth.cnrs.fr) **with a copy to the host**

**NB**

When setting up the programme all Indian Institutes taking part in the project agree that 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 cover the travel between the host institutes in France. Provision should be made for this cost to be taken care of by one of the institutes for example...).

## 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 <i>vs</i> relativistic fluid dynamics	Y2, Y3
		Jets in medium	Emergent phenomena in N-N collisions	Y1,Y2
		Quarkonium	Lattice simulations <i>vs</i> 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 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.

**Budget:** Since there is no need for equipment to carry any of the tasks, we do not allocate a special budget to a specific activity.



# Work

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- ❖ Working Group(s): meetings tomorrow