



# 25 years of the LHC experimental programme

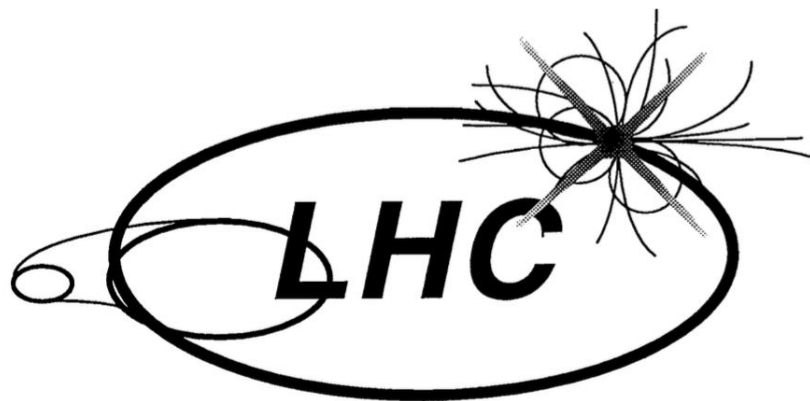
CERN, 15 December 2017  
Fabiola Gianotti

**ECFA**  
European Committee for Future Accelerators

**CERN**  
European Organization for Nuclear Research

## Towards the LHC Experimental Programme

5-8 March 1992  
Evian-les-Bains, France



## LHC EXPERIMENTAL PROGRAMME

15 DECEMBER 2017  
11:00 hrs – 16:00 hrs  
MAIN AUDITORIUM

<https://indico.cern.ch/e/symposium-25Years-LHC>

**ORGANISING COMMITTEE**

— Federico Antonini  
— Juan Barber  
— Gaetano Casarini  
— Eckhard Elsen  
— Fabiola Gianotti  
— Gian Gaudin  
— Andrea Heister  
— Karl Jakobs  
— Peter Jenni  
— Michelangelo Mangano  
— Takuya Nakada  
— Giovanni Pasolunghi  
— Jürgen Schrab  
— Jim Vlaske



Jointly initiated and organised by ECFA and CERN  
~ 650 participants



First public presentation of “expressions of interests” for LHC experiments

Set the stage for subsequent submission of Letters of Intent

Cemented the proto-collaborations

A memorable forum to discuss the LHC physics potential, the daunting experimental challenges, new concepts and technologies, and many ideas (dreams!)

The beginning of a long, challenging, hard, but very exciting, stimulating and instructive path that led to today’s extremely successful LHC programme



## (Main) previous milestones

- 1979: ECFA-LEP Working Group (chaired by A. Zichichi): “A tunnel with 27km circumference and a diameter of 5m with a view to the replacement of LEP at the end of its activities by a proton-proton collider using cryogenic magnets”
- 1984: Lausanne Workshop: feasibility of a pp collider in the LEP tunnel
- 1987: La Thuile: under auspices of CERN’s Long Range Planning Committee (chaired by C. Rubbia), a 16 TeV pp collider was recommended
- 1989: Barcelona workshop on instrumentation
- 1990: Aachen workshop on physics objectives
- 1990: Detector Research Development Committee (DRDC) set up to stimulate R&D on detector technologies satisfying the LHC requirements (physics/performance, event rate, harsh environment)
- 1991: Council agreed that the LHC “was the right machine for the advance of the subject and the future of CERN”

We applaud the vision of the people who took these great decisions

# 12 EoI presented in Evian

- 4 general-purpose pp experiments: ASCOT, EAGLE, CMS, L3+  
→ subsequently, ASCOT and EAGLE merged to form ATLAS
- 3 experiments for B-physics (gas-jet target, extracted beams, collider)
- 3 heavy-ion experiments (CMS, modified DELPHI, dedicated detector)
- 2 neutrino experiments



ATLAS, CMS    Lol in October 1992

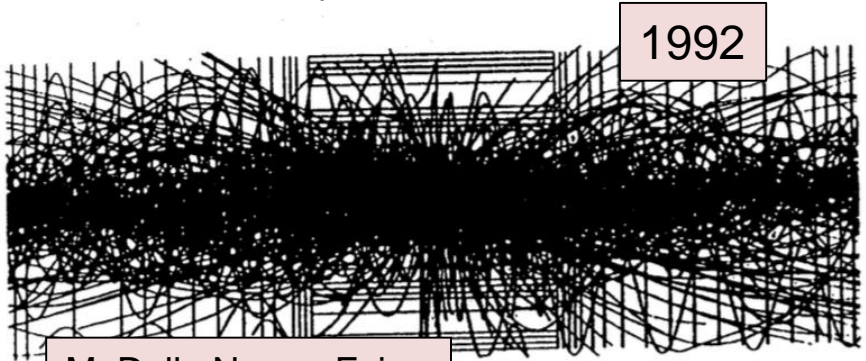
ALICE            Lol in 1993

LHCb             Lol in 1995

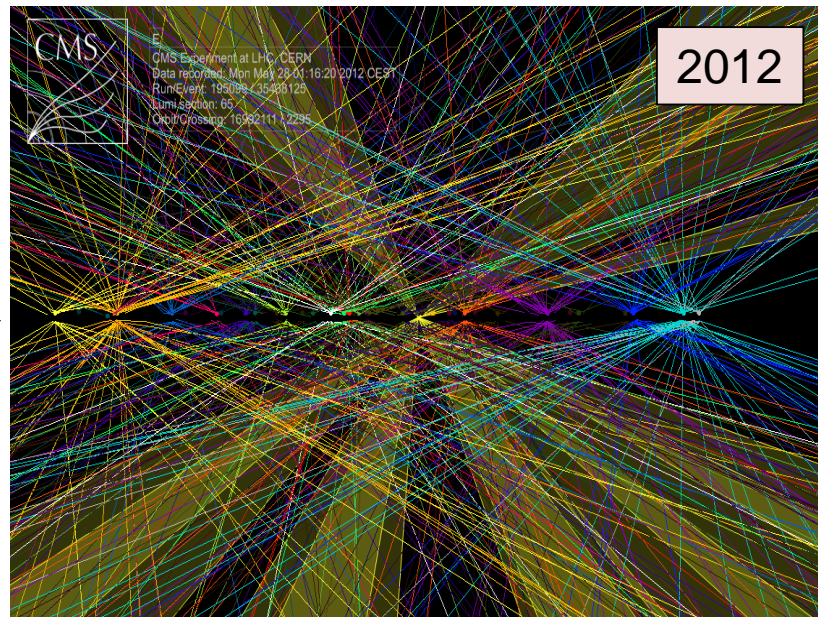
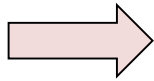
# We have come a long way since then ... an example

**1 CROSSING AT  $10^{34}$ :**

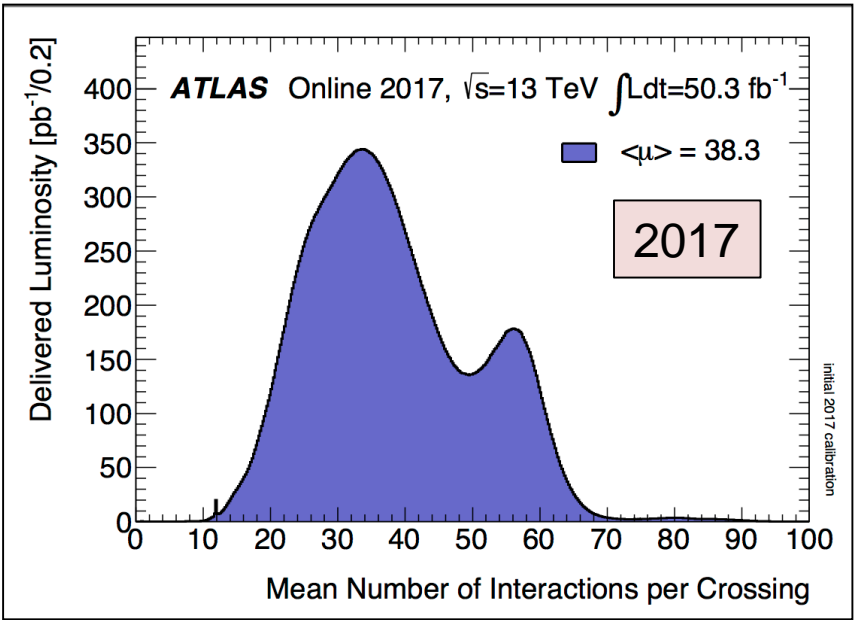
**15 Min. Bias !**



M. Della Negra, Evian



Event recorded by CMS in 2012 with ~ 30 reconstructed events





# Today's symposium

## **LHC History: 20' + 5' - 500-1-001 - Main Auditorium (11:00-12:30)**

time	title	presenter
11:00	Welcome	GIANOTTI, Fabiola
11:10	The Genesis of the LHC	LLEWELLYN-SMITH, Chris
11:35	Particle physics at around 1990	ELLIS, Jonathan R.
12:00	The long road to the LHC	EVANS, Lyn

## **Physics Opportunities and the Formation of the LHC Collaborations: 20' + 5' - 500-1-001 - Main Auditorium (13:30-15:10)**

time	title	presenter
13:30	ATLAS	JENNI, Peter
13:55	CMS	DELLA NEGRA, Michel
14:20	LHCb	NAKADA, Tatsuya
14:45	ALICE	SCHUKRAFT, Jurgen

## **Physicists Jamboree on recent LHC Results: 12' + 3' - 500-1-001 - Main Auditorium (15:10-16:10)**

time	title	presenter
15:10	ALICE	David Dobrigkeit Chinellato
15:25	ATLAS	Valerio Dao
15:40	CMS	Louise Skinnari
15:55	LHCb	Patrick Haworth Owen



# WELCOME!

To a **celebration** of:

## ❑ PHYSICS

- ❑ The competence, creativity, enthusiasm, motivation, determination, courage and patience of the worldwide LHC particle physics community (accelerator, experiments, computing, theory) in facing the big challenges of an unprecedented project.
- ❑ The strong, sustained support of CERN's Member States and Funding Agencies of countries from across the world



THANK YOU !



# EXTRAS



**Thursday 5 March**

**Chairman : R. Cashmore (Oxford)**

09.00	Opening	G. Flügge (Aachen)
09.10	Physics with proton beams	C. Llewellyn Smith (Oxford) A. De Rújula (CERN)
11.00	<i>Coffee</i>	
11.30	Heavy ion physics	U. Heinz (Regensburg)
12.15	Electron-proton physics	G. Wolf (DESY)
13.00	<i>Lunch</i>	

**Chairman : P. Darriulat (CERN)**

14.30	Expression of Interest & Discussion (EoI) The ASCOT detector at the LHC	P. Norton (Rutherford Lab.)
16.00	<i>Tea</i>	
16.30	EoI : CMS – a compact solenoidal detector for LHC	M. Della Negra (CERN) H. Desportes (Saclay)
18.30	Drink at the Conference Centre offered by the Mayor of Evian-les-Bains	



## Friday 6 March

**Chairman : A. Astbury (Victoria)**

- |       |   |   |
|-------|---|---|
| 09.00 | EoI : EAGLE – Experiment for Accurate Gamma, Lepton and Energy measurements | P. Jenni (CERN)                             |
| 10.30 | <i>Coffee</i>   |   |
| 11.00 | EoI : To upgrade the L3 detector for LHC                                    | S.C.C. Ting (MIT)<br>F. Pauss (ETH, Zürich) |
| 12.30 | <i>Lunch</i>  |   |

**Chairman : J. Haïssinski (Paris)**

- |       |   |                     |
|-------|---|---------------------|
| 14.00 | EoI : An LHC collider beauty experiment for CP-violation measurements     | P. Schlein (UCLA)   |
| 14.45 | EoI : Measurement of CP-violation in B-decays using an LHC extracted beam | G. Carboni (Pisa)   |
| 15.30 | <i>Tea</i>  |                     |
| 16.00 | EoI : A study of CP-violation in B-meson decays using a gas jet at LHC    | T. Nakada (PSI)     |
| 16.45 | EoI : Neutrino physics at LHC   | K. Winter (CERN)    |
| 17.15 | EoI : A neutrino experiment at LHC  | F. Vannucci (Paris) |
| 17.45 | End of Session  |                     |

## Saturday 7 March

*Chairman : L. Mandelli (Milan)*

09.00	EoI : A dedicated heavy ion experiment at the LHC	J. Schukraft (CERN)
10.15	EoI : A feasibility study of using DELPHI as a detector for heavy ion collisions at LHC	G. Jarlskog (Lund)
10.30	<i>Coffee</i>	
11.00	EoI : A heavy ion experiment with CMS at LHC	L. Ramello (Turin)
11.30	The RHIC experimental programme	T. Ludlam (Brookhaven)
12.10	HERA news	A. Wagner (DESY)
12.30	<i>Lunch</i>	

*Chairman : W. Hoogland (CERN)*

14.00	Status of detector R&D	E. Iarocci (Frascati)
15.00	Triggering & data acquisition	S. Cittolin (CERN)
15.45	<i>Tea</i>	
16.15	Computing & networking	P.G. Innocenti (CERN)
17.00	The SSC experimental programme	R. Stefanski (SSC Laboratory)
17.45	End of Session	
19.30	Dinner at the Conference Centre	

## Sunday 8 March

*Chairman : G. Flügge (Aachen)*

09.00	The LHC Machine	G. Brianti (CERN)
09.45	Experimental areas + scenarios	K. Eggert (CERN)
10.30	<i>Coffee</i>	
11.00	Closing Remarks	C. Rubbia (CERN)
12.00	End of Meeting	