

# INTERNATIONAL MASTERCLASSES HANDS ON PARTICLE PHYSICS

## Moderators' orientation

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CERN, 04.02.2016



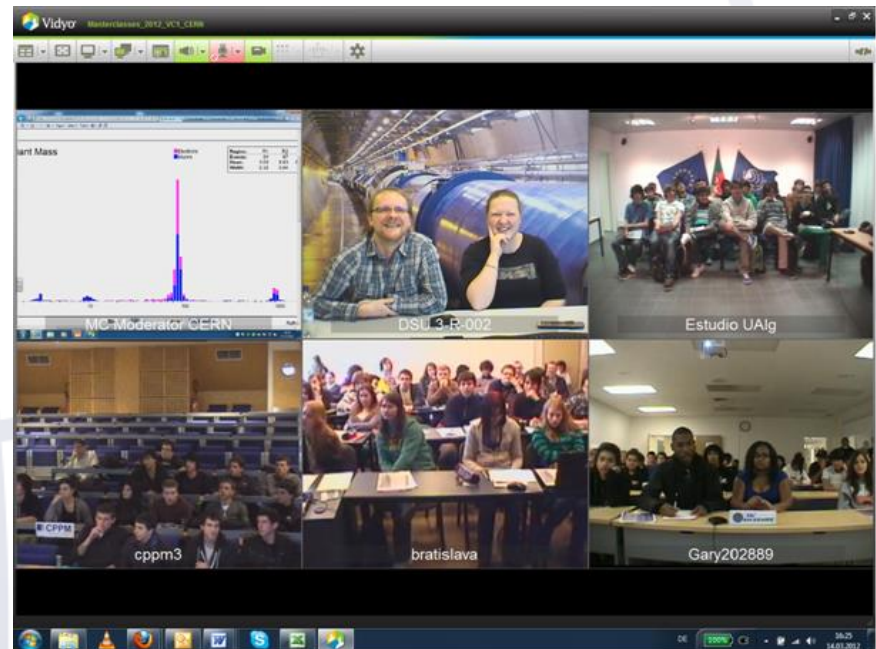
# What is a Particle Physics Masterclass?

- As in a masterclass in the arts, students work with an expert
- Expert = particle physicist
- Instead of, say, a violin, the subject is particle physics data analysis

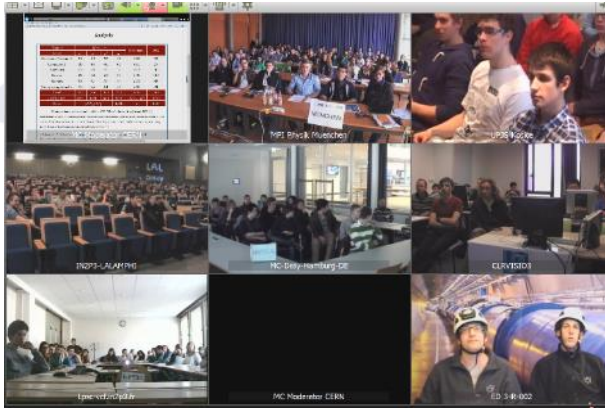


# Concept of IMC

- High school students (15 – 19) are „scientists for one day“
- Get invited to a research institute or university
- Introductory talks (standard model, detectors, accelerators)
- 2 h measurement with LHC data
- International video conference ( 3 – 5 inst. + CERN/Fermilab)



# Sample Agenda



## LOCAL TIME:

8:30 - 9:00

9:00 - 10:00

10:30 - 11:30

12:00 - 13:00

13:00 - 15:00

15:00 - 16:00

16:00 - 17:00

## ACTIVITY:

registration & welcome

introduction to Particle Physics

second talk or tour





























lunch

data analysis

local combination + discussion

video conference with CERN  
or Fermilab

# Moderators Schedule

 Noemi Calace (ATLAS)	 Mirko Casolino (ATLAS)	 Maria Cepeda (CMS)	 Ina Chalupkova (ATLAS)
 André David (CMS)	 Pasquale Nezza (ALICE)	 Agnieszka Dziurda (LHCb)	 Yiota Foka (ALICE)
 Rebeca Gonzalez Suarez (CMS)	 Christian Gütschow (ATLAS)	 Christian Gumpert (ATLAS)	 Stefanie Hanisch (ATLAS)
 Marco Harrendorf (CMS)	 Despina Hatzifotiadou (ALICE)	 Michael Hauschild (ATLAS)	 Thibaud Humair (LHCb)
 Roland Jansky (ATLAS)	 Jelena Jovicevic (ATLAS)	 Suzanne Klaver (LHCb)	 Jochen Klein (ALICE)
 Daniel Lellouch (ATLAS)	 Lucie Linssen (CLICdp)	 Joany Manjarres (ATLAS)	 Javier Montejo Berlingen (ATLAS)
 Marcus Morgenstern (ATLAS)	 David Morse (CMS)	 Chris Neu (CMS)	 Estel Perez (ATLAS)

	Mon, Mar 14	Tue, Mar 15	Wed, Mar 16	Thu, Mar 17	Fri, Mar 18	Sat, Mar 19
topic	VC 1: ATLAS W	VC 1: ATLAS Z	VC 1: ATLAS W	VC 1: ATLAS Z	VC 1: ATLAS Z	VC 1: ATLAS Z
moderators	Noemi	Daniel	Christian Gum.	Mirko	Steven	Stefanie Hanisch
moderators	Roland	Arturo	Mirko	Estel	Estel	Muhammad
	Wuppertal 	Ankara METU 	Orsay LAL 	Berlin/Zeuthen 	Strasbourg 	Coimbra 
	Geneva Cern 	Marseille 	Bonn 	Ankara METU 	Prague CTU 	Louisiana Tech 
	Madrid IFT 	Rehovot 	Rome Tor Vergata 	Dortmund 	Zaragoza 	Lisbon IST 
	Dresden 	Annecy 	Wuppertal 	Uppsala 	Al-Hoceima 	Crete 
		Oujda 	Hamburg DESY 	Strasbourg 	Trencin 	Lisbon FCUL 
topic	VC 2: CMS	VC 2: ALICE S.P.	VC 2: CMS	VC 2: LHCb	VC 2: ALICE S.P.	
moderators	Maria	Roberto	Rosa	Aga	Roberto	
moderators	Rebeca	Despina	Michael H.	Federico	Pasquale	
	Padova 	Padova 	Firenze 	Perugia 	Cape Town iThemba 	
	Dublin UCD 	Maynooth 	Lyon 	Frascati 	São Paulo 	
	Genoa 	Nantes 	Torino 	Ferrara 	Prague 	
	São Paulo SPRACE 	Copenhagen 	Cyprus 	Marseille 	Nantes 	
	Požega 	Bari 	Padova 	Padova 	Orsay IPN 	

[www.physicsmasterclasses.org/index.php?cat=schedule#moderators](http://www.physicsmasterclasses.org/index.php?cat=schedule#moderators)



# Video Conference

	Mon, March 4	Tue, March 5	Wed, March 6	Thu, March 7	Fri, March 8	Sat, March 9
topic		VC 1: ATLAS Z	VC 1: ATLAS W	VC 1: ATLAS Z	VC 1: ATLAS W	VC 1: ATLAS Z
moderators		Andrée, Juan	Eva, Kilian	Predrag, Juan	Katharine, Duc Bao	Guilherme, N.N.
		Lecce	Valencia	Alexandria	Bucharest	Lisboa IST
		Birzeit	Tarnow	Barcelona	Katowice	Krakow
		Rehovot	Maynooth	Stockholm	Brookhaven	Quinhá
		Graz	Madrid IFT	Banska Bystrica	Marseille	
		Granada	London Queen Mary	Bergen	Curitiba	
topic	VC 2: CMS	VC 2: ATLAS W	VC 2: CMS		VC 2: CMS	
moderators	Sarah, Predrag	Katharine, Ricardo	Sarah, Chris	Sarah, Chris		
	Rio de Janeiro	Orsay	Nicosia	Athens, Demokritos		
	Santander	Lund	Zilina	Debrecen		
	Trieste	Marseille	Ponte Delgada	Vienna HEPHY		
	Helsinki	Durban	Perugia	Split		
				Cincinnati		

- VC 1 / VC 2 (same date, but different locations, physical and Vidyo!)
- Moderators work in pairs
- max. 5 institutes

<http://physicsmasterclasses.org/index.php?cat=schedule>



# International Masterclasses 2016

- Organized by IPPOG (*International Particle Physics Outreach Group: independent group of outreach representatives from countries at CERN*)
- 11.2. - 23.3.2016
- 45 countries involved



Coord.: QuarkNet / TU Dresden



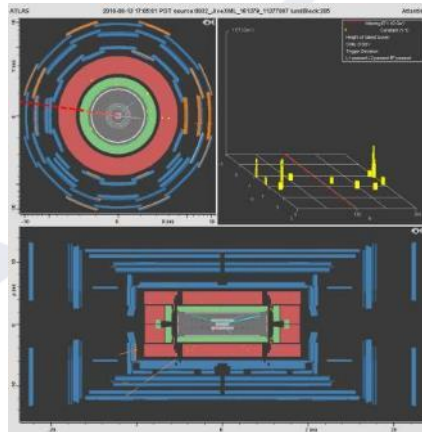
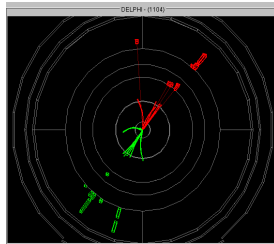
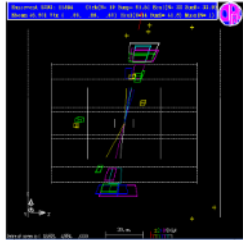
- 42 institutes
- 48 Masterclasses
  - 35 CMS
  - 13 ATLAS
- 22 video conf. with Fermilab



- 170 institutes
- 246 Masterclasses
  - 134 ATLAS
  - 56 CMS
  - 32 LHCb
  - 24 ALICE
- 54 video conf. with CERN

# Brief History of Masterclasses

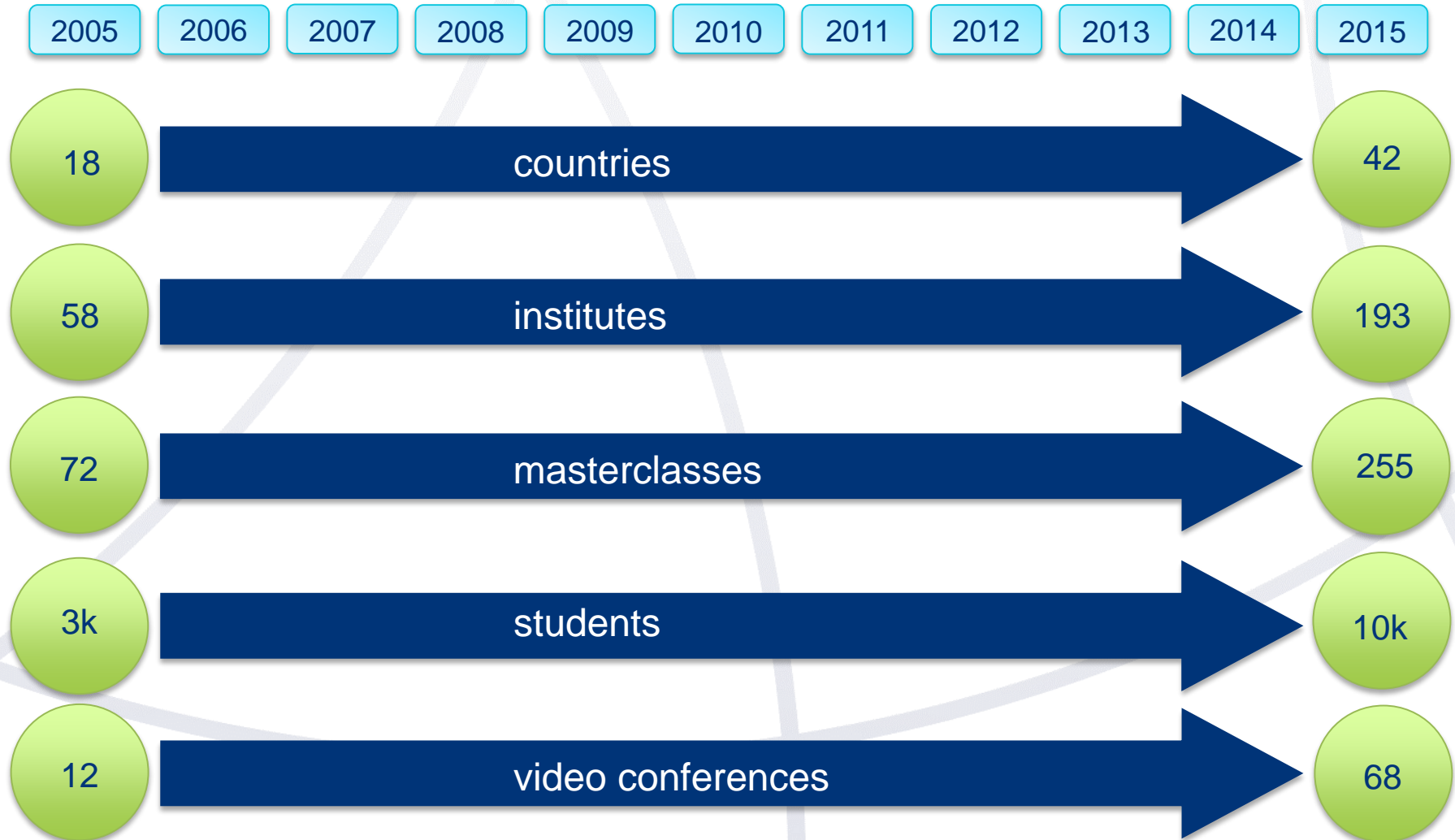
- Idea from UK, 1996 (R. Barlow et al.)
- 1997: 1. Masterclass in UK with 7 institutes
- 1998 nationwide uptake
- 2005: Adopted by EPPOG/IPPOG for all Europe
- Use of LEP data
  - OPAL Identifying Particles
  - DELPHI Hands on CERN
- 2006: U.S. joined program (QuarkNet)
- 2011: LHC-based Masterclasses only
- 2014: all 4 LHC experiments



<http://cerncourier.com/cws/article/cern/55890> (How it all begun)  
<http://cerncourier.com/cws/article/cern/57305> (MC in the LHC era)



# History and Statistics



# Enjoy your sessions!



## Thank you for being part of International Masterclasses 2016!