

<https://particleface.eu>



@PARTICLEFACE

Working Group and MC meeting of the COST Action CA16201

Unraveling new physics at the LHC through the precision frontier

About the COST Action CA16201

particleface

Germán Rodrigo

IFIC
INSTITUT DE FÍSICA
CORPUSCULAR

EXCELENCIA
SEVERO
OCHOA

CSIC

VNIVERSITAT
ID VALÈNCIA

Krakow, 11-13 February, 2020

The aim of PARTICLEFACE is to **shift the precision frontier in theoretical high-energy physics to a new level of accuracy** and to create new resources of networking and innovation, with the quest for **discovery** as the main motivation.

It is designed to work through long-standing challenges on the basis of the most encouraging advances in Quantum Field Theory and related areas of pure mathematics and computer science by uniting the leaders of the field in a coherent effort.



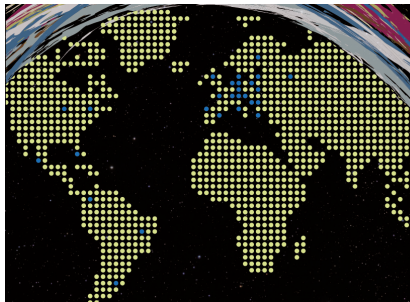
particleface

11.2016
54 proposers
13 + 1 NNC + 4 IPC = **18**
2 ITC (15%)

02.2018
110 researchers
18 + 1 NNC + 5 IPC = **24**
6 ITC (33%)

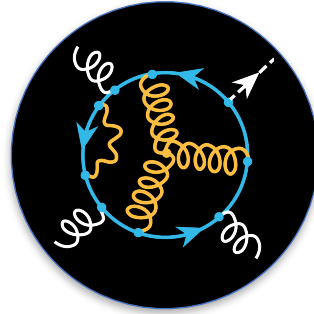
02.2019
206 researchers
23 + 1 NNC + 5 IPC = **29**
9 ITC (39%)

02.2019
280 researchers
24 + 2 NNC + 5 IPC = **31**
10 ITC (42%)

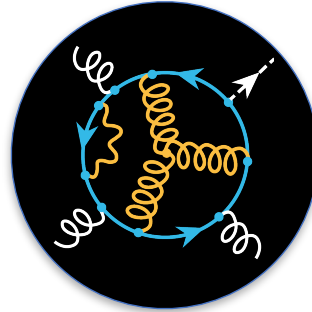


Country	Date
Austria	18/07/2017
Belgium	20/10/2017
Bosnia and Herzegovina	ITC 23/03/2018
Croatia	ITC 06/12/2017
Denmark	13/11/2017
Estonia	ITC 04/10/2017
Finland	20/09/2017
France	11/07/2017
Germany	18/07/2017
Greece	13/07/2017
Hungary	ITC 11/07/2017
Ireland	24/05/2018
Italy	14/09/2017
Latvia	ITC 18/10/2018
Lithuania	ITC 04/04/2019
Netherlands	10/08/2017
Poland	ITC 26/07/2017
Portugal	ITC 07/12/2017
Slovenia	ITC 27/10/2017
Spain	22/08/2017

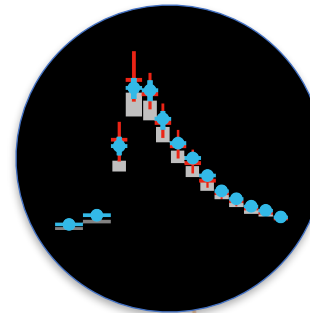
Country	Date
Sweden	14/03/2018
Switzerland	11/07/2017
Turkey	ITC 18/10/2018
United Kingdom	14/07/2017
Total: 24 - Quorum 16	
Near Neighbour Countries	Country
Moscow State University	Russia
Joint Institute for Nuclear Research Dubna	Russia
Mohammed V University in Rabat	Morocco
International Partner Countries	Country
Universidad Autónoma de Sinaloa	Mexico
Universidad Nacional San Martín	Argentina
Pontificia Universidade Católica do Rio de Janeiro	Brazil
Universidade Estadual Paulista	Brazil
Universidade Federal do ABC	Brazil
Argonne National Laboratory	US
Florida State University	US
State University New York at Buffalo	US
Universidad Nacional de Colombia	Colombia



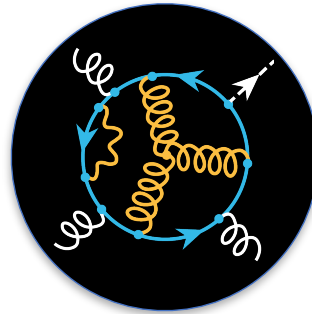
WG1: Innovative
Quantum Field Theory



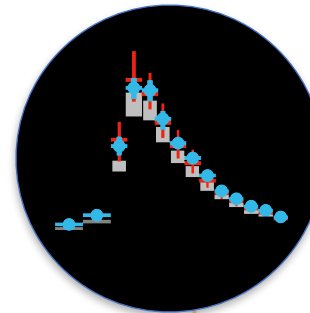
WG1: Innovative
Quantum Field Theory



WG2: Precision
Phenomenology



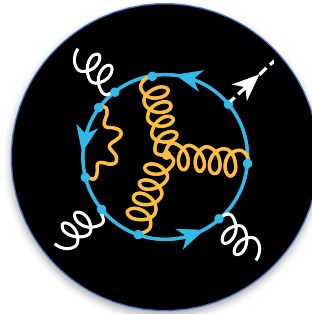
WG1: Innovative
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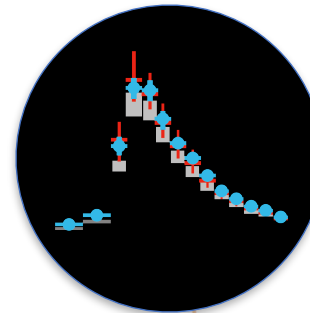
WG2: Precision
Phenomenology



WG3: Future
Colliders



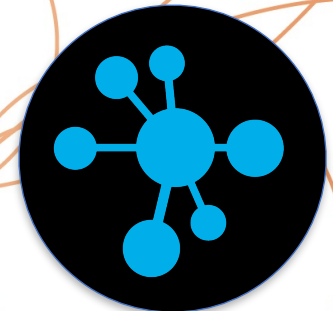
WG1: Innovative
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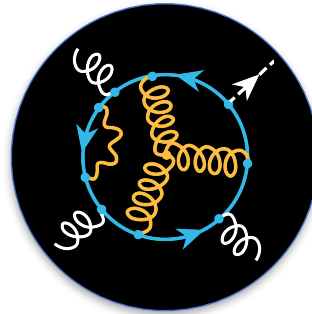
WG2: Precision
Phenomenology



WG3: Future
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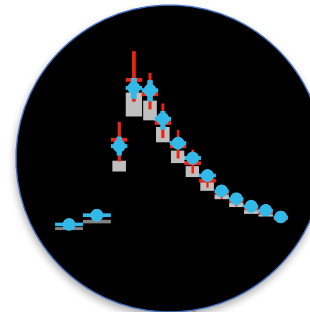
WG4: Training and
Networking



WG1: Innovative
Quantum Field Theory



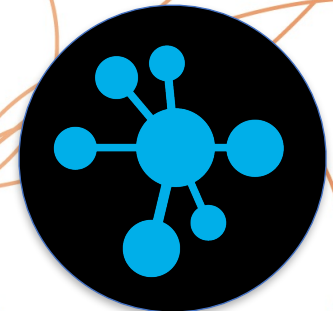
WG5: Inclusiveness,
Gender, Open Innovation
and Outreach



WG2: Precision
Phenomenology

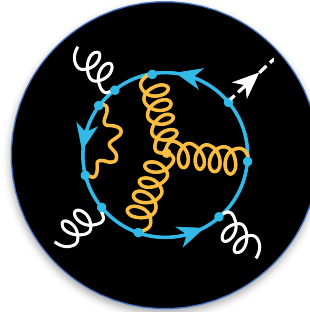


WG3: Future
Colliders



WG4: Training and
Networking

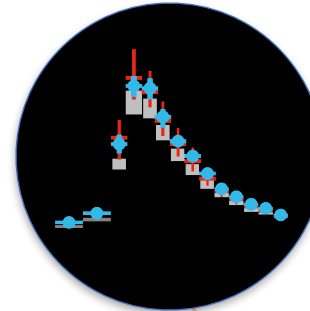
WG Leaders	WG1	Claude Duhr (BE) Carsten Schneider (AT)
	WG2	Malgorzata Worek (DE) Daniel de Florian (AR)
	WG3	Janusz Gluza (PL) Radja Boughezal (US)
	WG4	Sven-Olaf Moch (DE)
	WG5	Gabor Somogyi (HU) Martin Gorbahn (UK)



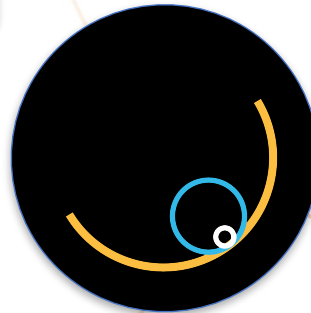
WG1: Innovative
Quantum Field Theory



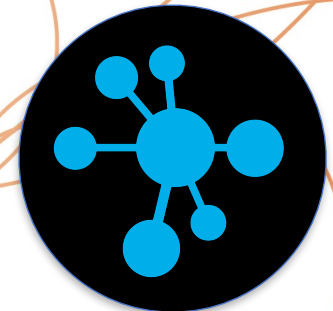
WG5: Inclusiveness,
Gender, Open Innovation
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WG2: Precision
Phenomenology



WG3: Future
Colliders



WG4: Training and
Networking

GRANT PERIODS

MC1: start of the Action 24 October 2017

GP1: 1 November 2017- 30 April 2018

GP2: 1 May 2018 - 30 April 2019

GP3: 1 May 2019 - 30 April 2020

GP4: 1 May 2020 - 30 April 2021

GP5: 1 May 2021 - **end of the Action 23 October 2021**

- **MC Meeting:** at least one per Grant Period
- **WG Meetings**
- **Training Schools**
- **STSM**
- **ITC Conference Grants**

STSM Coordinator
Vittorio del Duca (CH)

8 in GP1
17 in GP2
7 in GP3

15 in GP2
14 in GP3 so far

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Reports at M12, M24 completed
M48 next

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Action activities within
a single Grant Period

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CA16201 - Unraveling new physics at the LHC through the precision frontier

Home > Browse Actions > Unraveling new physics at the LHC through the precision frontier

 particleface.eu/

 Downloads  Team

Description

Parties

Management Committee

Description

http://www.cost.eu/COST_Actions/ca/CA16201

Elementary particle physics is currently described by the Quantum Field Theory (QFT) called the Standard Model (SM). The SM, being an apparent success, is well known to be theoretically incomplete. Fundamental questions underlying the quantum structure of Yang-Mills theories are still unanswered. The SM does neither account for mass hierarchies nor for dark matter or dark energy. Most importantly it cannot remain valid to arbitrarily high energies and does not include gravity. After the confirmation of the Higgs boson's existence, entirely new questions come into the focus in the field.

The key to address those questions is to confront experimental data to theoretical predictions with the highest possible precision. The current LHC data do not show a clear signal of new physics. Therefore, any evidence is expected to appear as a gentle deviation from the SM. Precision phenomenology is the necessary prerequisite for theory and collider physics in the coming years and it will be the driving element in the development of new and innovative tools and algorithms to perform a meaningful comparison between theory and data.

The aim of this Action is to shift the precision frontier to a new level of accuracy and to create new resources of networking and innovation, with the quest for discovery as the main motivation. It is designed to work through long-standing challenges on the basis of the most encouraging advances in QFT and related areas of pure mathematics and computer science by uniting the leaders of the field in a coherent effort.

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New profiles
Reimbursements
STSM, ITC Grants
applications ...

Actions Overview

Grant Periods

International Cooperation

STSM Applications

ITC Conference Grants

Main Contacts



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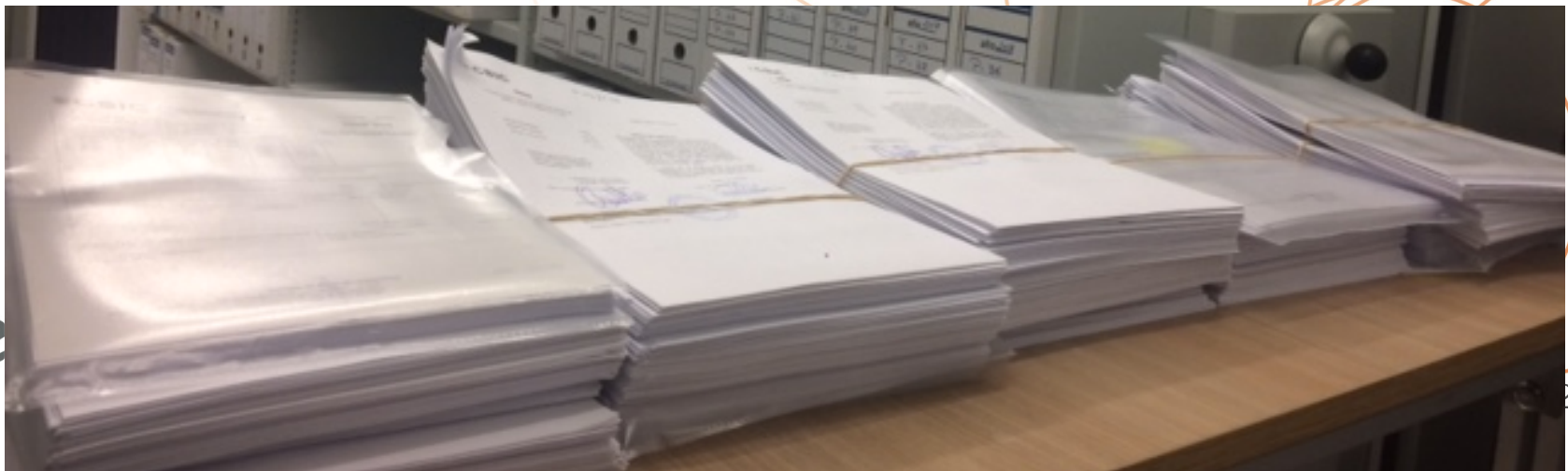
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- **MC/WG Meetings:** accommodation is reimbursed at **flat rate**, travel at real cost paid by the researcher (**no travel agency!!**) + meals not covered by **LOS**
- **STSM** and **ITC Conference Grants** are a fixed amount that covers or not the full cost, however, at the time of application you can specify travel and fee, if possible **only accommodation** (due to CSIC rules)
- Extra financial documents required by CSIC: you can trust Maria.J.Gracia@ific.uv.es

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Fecha: 07/02/20 (14:01:36 CET)
De: Science Administration <Science.Administration@cost.eu>
Asunto: Simplification Reimbursement Rules

 Texto (14 KB)  

Dear MC Chairs,
Dear Grant Holders,

We would like to inform you of some positive changes that would be coming into effect on 1 May 2020. To provide the participants with greater autonomy and ease of use of the travel reimbursement rules, we are introducing a simplification of the reimbursement procedure for meetings and training schools.

Regarding Meetings:

The change of the reimbursement procedure implies that the flat rates for accommodation and for meals will be replaced by a Daily Allowance which is a package that includes accommodation, meals, and any type of local transport up to 100 km (taxi, car, local ferry, parking, public transport). Plane tickets and any long-distance transport above 100 km will continue to be reimbursed as usual, based on the supporting documents (invoices, tickets, receipts).

The level of the Daily Allowance per day is determined by the country where the event takes place. The rates can be consulted in the attached Daily Allowance table.

Regarding Training Schools:

The trainee's grant will be replaced by a reimbursement based on a Daily Allowance. This means that both trainers and trainees will be reimbursed in accordance with their travel and accommodation expenditure. This would ensure a fair reimbursement to each trainee, independent of their country of origin. It would also guarantee that any long-distance travel would be reimbursed in full, without the trainee having to find additional source of funding.

The MC can decide to decrease the amount of the Daily Allowance or provide a different rate for the trainees and for trainers.

Events of the second Grant Period (May 2018-Apr 2019)

- **BALATON 2018: Feynman Memorial Meeting**, Balatonfüred, Hungary, 16-19 September 2018
- **1st Workshop on High Energy Theory and Gender**, CERN, 26-28 September 2018
- **Case studies WG1 and WG3 Meeting**, Katowice, Poland, 1-5 October 2018
- **WG2 Meeting on Next-to-Leading Power Corrections**, Amsterdam, 5-7 November 2018
- **PARTICLEFACE 2019: Working Group Meeting and Management Committee Meeting**, Coimbra, 26-28 February 2019
- **CAPP-PARTICLEFACE School**, Hamburg, 25-29 March 2019



UNIVERSITY OF DEBRECEN

BALATON2018

Feynman Memorial Meeting

Keynote Speakers:

- Samuel ABREU
- Christina BOGNER
- Christian BROENNUM-HANSEN
- Maria CERDA-SEVILLA
- Hareesh CHANDRHY
- Ngela FELLEISIO
- Alexandros GEORGIOUDIS
- Janiusz GLUZA
- Thomas HAHN
- Johannes HENN
- Zoltan KUNZST
- Roman LEE
- Roberto MARZUCCA
- Pierpaolo MAZZUOLA
- Francesco MORIELLO
- Konstantinos PARADOPOULOS
- Sergio RODRIGO
- Sebastian SAPETA
- Alexander SMIRNOV
- Vladimir SMIRNOV
- Vesly SOTNIKOV

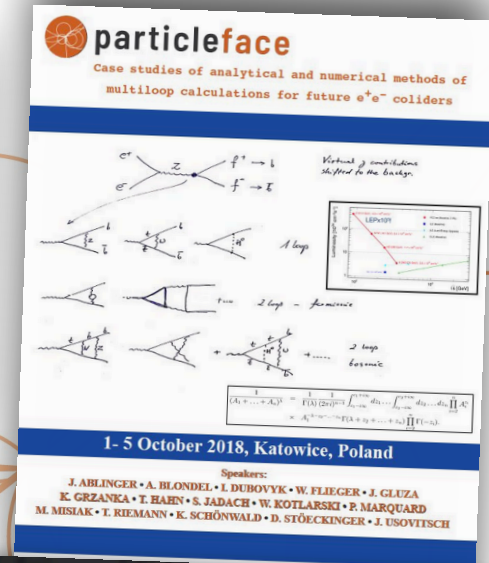
Organizers:

- Stavros BELLICOURA
- Adam KAPDAS
- Gabor SOMODI
- László TÓTH
- Zoltan TULPÁNT

16-19 September, 2018,
Balatonfüred, Hungary

<https://particleface.eu>

particleface **cost**
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

particleface

Case studies of analytical and numerical methods of multiloop calculations for future e^+e^- colliders

1-5 October 2018, Katowice, Poland

Speakers:

J. ABLINGER • A. BLONDEL • L. DUBOVYK • W. FLIEGER • J. GLUZA
 K. GRZANKA • T. HAHN • S. JADACH • W. KOTLARSKI • P. MARQUARD
 M. MISIAK • T. RIEMANN • K. SCHÖNWALD • D. STÖCKINGER • J. USOVITSH



Events of the third Grant Period (May 2019-Apr 2020)

The following events have been approved in the past MC meeting:

- [PREFIT School - Precision meets EFT at the LHC: joint theoretical and experimental school of the COST Actions VBSCAN and PARTICLEFACE, Hamburg, 2-13 March 2020](#)
- [PARTICLEFACE 2020: Working Group Meeting and Management Committee Meeting, Krakow, 11-13 February 2020](#)
- [15th Vienna Central European Seminar: Precision Physics at the LHC, Wien, 28-29 November 2019](#)
- [WG1 Meeting - WorkStop/ThinkStart 3.0: paving the way to alternative NNLO strategies, Firenze, 4-6 November 2019](#)
- [School of Analytic Computing in Theoretical High-Energy Physics, Atrani, 2-11 October 2019](#)

PARTICLEFACE supports also participation in the following events through [ITC Conference Grants](#): [Ljubjiana 2019](#), [Corfu 2019](#), [MTTD 2019](#), [Brda 2019](#) and [PCQFT 2020](#).



PREFIT-School
PRecision **E**ffective **F**ield **T**heory **S**chool
2-13 March 2020 at DESY, Hamburg

Nobel-díjas fizikusra emlékeztek Füreden

Egy európai együttműködés keretében, pályázati forrásból rendeztek emlékkonferenciát Balatonfüreden, a száz éve született amerikai Nobel-díjas fizikus Richard Feynman tiszteletére. A zömében fiatal fizikusokból álló résztvevők a program részeként, felekeresték a Feynman által 1972-ben ültetett fát.



Alain Blondel @Babo_Ferney · 4 Oct 2018
wonderful hospitality by our Polish colleagues, and many lively questions!

PARTICLEFACE COST @PARTICLEFACE
On October 4th at 16:00, Prof. Alain Blondel from U. Geneva and CERN will deliver a public talk at the Polish Physical Society @USinKatowice on Fundamental questions and collider solutions @COSTprogramme @PARTICLEFACE ptf.us.edu.pl/wordpress/?p=7...

PARTICLEFACE COST @PARTICLEFACE · 11 Dec 2018
Our colleague Adam Kardos from @DEgyetem has giving a public outreach talk at the Andras Mechwart Secondary School, Debrecen, on the life and times of Richard P. Feynman. Slides (in Hungarian) can be downloaded from shrek.unideb.hu/~adamkardos/ka... @COSTprogramme



Science Communication Manager Gudrun Heinrich (DE)

INVESTIGADOR DE LA UNIVERSIDAD DE VALENCIA, ESPAÑA VISITA LA FCFM PARA ESTABLECER RED DE COLABORACIÓN

Proporcionar nuevas herramientas, cálculos teóricos aplicados a física matemática para entender nuevas propiedades de las amplitudes de scattering, formando nuevos grupos de trabajo en red con investigadores de la Facultad de Ciencias Físico-Matemáticas de la Universidad Autónoma de Sinaloa (UAS), es el objetivo de visita de investigador de la Universidad de Valencia, España.

Y es que comentó que el puente de interacción con los investigadores de la FCFM-UAS es el doctor Roger Hernández Pinto, quien colabora en proyecto similar con Torres Bobadilla en el aspecto de fenomenología aplicada a la física para máquinas hadrónicas.

- Actualmente trabaja en las amplitudes de scattering en el Gran colisionador de Hadrones (LHC, por sus siglas en inglés) y refiere generar línea de investigación teórica sobre lo que se conoce como dispersión de partículas

Conferencista también en el 3er Congreso Internacional de Física, Matemáticas y Electrónica, el doctor William Javier Torres Bobadilla, integrante del Instituto de Física Corpuscular, actualmente trabaja en las amplitudes de scattering en el Gran colisionador de Hadrones (LHC, por sus siglas en inglés) y refiere generar línea de investigación teórica sobre lo que se conoce como dispersión de partículas.

Señaló que actualmente colabora en una red de investigadores de la Unión Europea cuyo propósito es fortalecer la investigación científica y técnica, financiando el establecimiento de redes de colaboración e interacción entre investigadores, su nombre es COST y pertenece

Torres Bobadilla reiteró que es necesario la conjunción de investigadores para "atender nueva física, es decir, obtener nuevas partículas a partir del experimento (LHC)", indicó.

En cuanto al tema de investigación que actualmente trabaja, William Javier Torres Bobadilla detalló que son cálculos de precisión en la producción del bosón de Higgs en un orden de precisión bastante alto, el bosón de Higgs es una partícula elemental propuesta en el modelo estándar de física de partículas.



William Javier Torres Bobadilla, investigador de la Universidad de Valencia, España.

JAIME MORALES

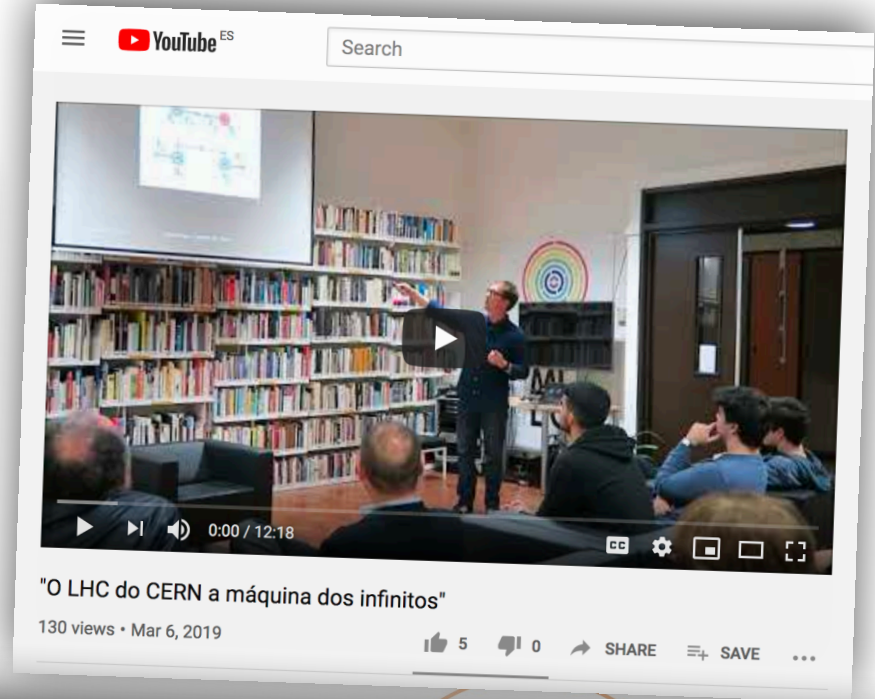
Visit to UA Sinaloa

COIMBRA - UNIVERSIDADE

50 cientistas em Coimbra “à procura de nova Física”

por Notícias de Coimbra Fevereiro 23, 2019

A famosa descoberta do bosão de Higgs no Large Hadron Collider (LHC), o maior acelerador de partículas do mundo, veio cimentar o Modelo Padrão como a teoria que descreve as interações fundamentais que regem as leis físicas.



"O LHC do CERN a máquina dos infinitos"

130 views · Mar 6, 2019

5 likes 0 comments SHARE SAVE

Nov 2019 · 30 days

TWEET HIGHLIGHTS

Top Tweet earned 451 impressions

We start with the WG1 meeting at the Galileo Galilei Institute @UNI_FIRENZE @comunefi three intensive days to discuss about new regularization schemes in quantum field theory at higher perturbative orders pic.twitter.com/9VRz093w02



3 retweets 5 likes

View Tweet activity

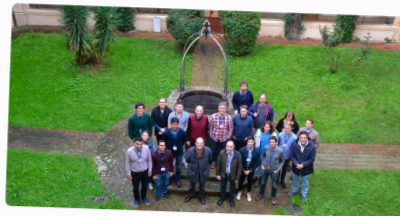
View all Tweet activity

Top mention earned 38 engagements

Germán Sborlini
@gfsborlini · Nov 28

Thanks to the COST Action PARTICLEFACE for supporting the "WorkStop/ThinkStart 3.0 Meeting", in the Galileo Galilei Institute!!! @PARTICLEFACE

indico.ific.uv.es/event/3737/
pic.twitter.com/r6QfllGDfO



5 retweets 9 likes

NOV 2019 SUMMARY

Tweets	2	Tweet impressions	1,677
Profile visits	142	Mentions	5
New followers	9		



@PARTICLEFACE

- Publications made as a result of **STSM / ITC Conference Grant** should include the following in the acknowledgements:

This work was supported by a STSM Grant / ITC Conference Grant from the COST Action CA16201 PARTICLEFACE.

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- Acknowledgements are welcome in papers involving authors from at least two countries and produced as the outcome of the collaboration within the network

This article is based upon work from COST Action CA16201 PARTICLEFACE supported by COST (European Cooperation in Science and Technology)

They will appear in the Action's list of publications (Deliverables **D1-D4**). Also mention COST in oral presentations / media interviews related to the Action.



Welcome to INSPIRE High Energy Physics information system. Please direct questions, comments or suggestions to feedback@inspirehep.net.

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find fulltext "particleface" or fulltext "CA16201" and date after 2016

Brief format

Search

Easy Search

Advanced Search

find j "Phys.Rev.Lett..105" :: more

Search on INSPIRE beta

Sort by:

Display results:

latest first desc - or rank by - 25 results single list

HEP 121 records found 1 - 25 jump to record: 1

Search took 2.64 seconds.

1. FindBounce: package for multi-field bounce actions

Victor Guada, Miha Nemevšek, Matevž Pintar. Feb 3, 2020. 30 pp.

e-Print: [arXiv:2002.00881](https://arxiv.org/abs/2002.00881) [hep-ph] | PDF

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2. Precise determination of α_s from relativistic quarkonium sum rules

Diogo Boito, Vicent Mateu. Jan 29, 2020. 35 pp.

IFT-UAM/CSIC-19-164

e-Print: [arXiv:2001.11041](https://arxiv.org/abs/2001.11041) [hep-ph] | PDF

[References](#) | [BibTeX](#) | [LaTeX\(US\)](#) | [LaTeX\(EU\)](#) | [Harvmac](#) | [EndNote](#)

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[Detailed record](#)

3. Doubly Charged Higgs Bosons and Spontaneous Symmetry Breaking at eV and TeV Scales

Janusz Gluza, Magdalena Kordiaczyńska (Silesia U. & Hradec Kralove U.), Tripurari Srivastava (Indian Inst. Tech., Kanpur & Ahmedabad, Phys. Res. Lab). 2020.

Published in *Symmetry* 12 (2020) no.1, 153

DOI: [10.3390/sym12010153](https://doi.org/10.3390/sym12010153)



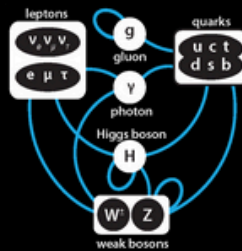
ABOUT PARTICLEFACE

PARTICLEFACE is a COST Action in the field of **theoretical elementary particle** and **high energy physics**. It involves an interdisciplinary community of more than 120 researchers from 27 countries with outstanding expertise in physics, mathematics and computer science.

THE STATE OF THE ART

Elementary particle physics is currently described by the Quantum Field Theory called the **Standard Model (SM)**. The SM, being the greatest success in particle physics, is well known to be theoretically incomplete. Fundamental questions underlying its **deep quantum structure** are still unanswered. The SM accounts neither for the observed **mass hierarchy** among elementary particles, ranging from the mass of the very light and elusive neutrinos to the top quark which is as heavy as a gold atom, nor for **dark matter** or **dark energy**. Most importantly, it cannot remain valid to arbitrarily high energies and does not include **gravity**. After the confirmation of the **Higgs boson's** existence at the CERN's Large Hadron Collider (LHC) in 2012, entirely new questions come into focus in the field.

The key to address those questions is to confront experimental data with theoretical predictions of the highest possible precision. This strategy is driven by the **quantum corrections** describing the collisions of elementary particles at the highest energies.



THE CHALLENGE

The aim of PARTICLEFACE is to **shift the current precision frontier** in theoretical high energy physics to a new level of accuracy and to create new resources of networking and innovation, with the **quest for discovery** at the LHC and future high-energy colliders as the main motivation.

It is designed to work through long-standing challenges on the basis of the most encouraging advances in Quantum Field Theory and related areas of pure **mathematics** and **computer science** by uniting the leaders of the field in a coherent effort.



HOW

Quantum corrections in Quantum Field Theory are encoded by physicists through **loop Feynman diagrams**. These diagrams, invented by the Nobel Prize Richard P. Feynman, represent pictorially all the quantum processes that occur at the subatomic level in high-energy collisions, like the creation and annihilation of new particles from the vacuum. Loop Feynman diagrams translate into complex mathematical expressions from which physicists can predict the behaviour of elementary particles at colliders. The LHC, and in the future other colliders, is producing data of such a high quality that more and more complex diagrams are necessary to interpret correctly potential signals of new physics with sufficient theoretical precision, then challenging our current understanding of QFT and its underlying mathematical structure.

The Action is structured into five Working Groups

WG1: will develop **innovative and cutting edge algorithms and methods** in QFT and computer algebra in the search for new advances regarding the understanding of the underlying quantum and mathematical structure. Developments will be tested with proof-of-concept computations.

WG2: will work on **precision phenomenology**. Based on the achievements of WG1, it will provide theoretical predictions and tools in fully differential kinematics to analyse specific processes at the LHC and push the frontier regarding the sensitivity to new discoveries.

WG3: will assess the discovery potential of **future high energy colliders**, based on the results obtained in WG1 and WG2.

WG4: is responsible for the organisation of **networking events**, specialised **training schools** and **short-term scientific missions** for the exchange of new ideas and the training of the next generation of researchers in the field.

WG5: regards the implementation of the COST **Inclusiveness** and **gender policies**, **dissemination** and **exploitation** of results and **public engagement**.

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MEETING ATTENDANCE LIST

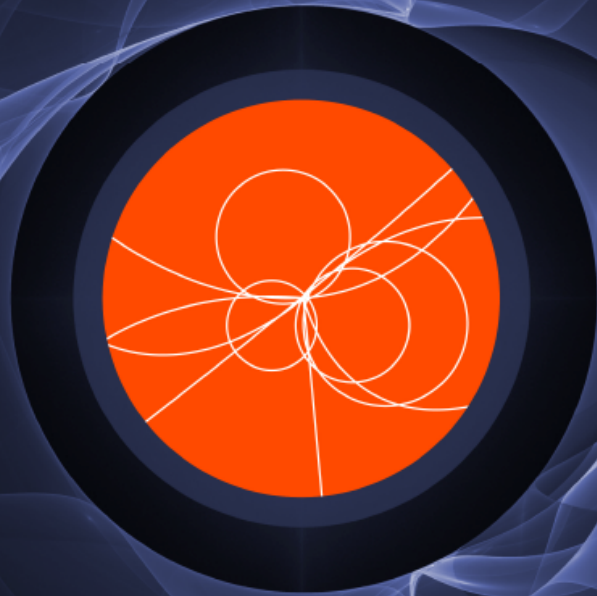
Meeting Title: PARTICLEFACE 2020		Start Date: 2020-02-11	End Date: 2020-02-13
Meeting Reference: ECOST-MEETING-CA16201-110220-114994		Action Number: CA16201	
Grant Holder:	E-mail:	Tel:	

Nr	Participant	Country	Signature 11/02/2020	Signature 12/02/2020	Signature 13/02/2020
1		ES			
2		HU			
3		DK			

Please, sign the attendance list, for this meeting and any forthcoming meeting

Working Group and MC meeting of the COST Action CA16201

Unraveling new physics at the LHC through the precision frontier



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