## DESY Virtual Theory Forum 2020

This meeting replaces the initially planned DESY Theory workshop entitled "Bright Ideas for a Dark Universe" which is postponed to 2021: <u>https://th-workshop2021.desy.de/</u> We really hope to see you all again in Hamburg next year.

Instead, this year: non-topical forum across all HEP-TH areas, to give opportunity to students and postdocs to present their work, in a all-plenary format, together with a few overview talks by more senior colleagues.

Heart-breaking talk selection as many excellent submitted abstracts could not be accommodated in the programme.

A premiere in the long tradition of annual DESY Theory workshops: This meeting will be hybrid. All sessions will happen at the same time remotely via Zoom and in the DESY Main Auditorium.

## Scientific Programme .

**Tuesday 13:30-18:30: Cosmology & Astroparticles** 

Wednesday 13:30-18:30: Particle Phenomenology

Thursday 12:45-17:30: Strings & Mathematical Physics Thursday 18:00: Public Hertz lecture

Friday 13:30-15:00: Cosmology & Astroparticles Friday 15:15-16:45: Particle Phenomenology Friday 17:00-18:20: Strings & Mathematical Physics

## 7 overview talks .

-Tuesday 13:45, Recent ideas for dark matter direct detection, by Yonit Hochberg (Jerusalem)

-*Tuesday 16:15*, New ideas from the neutrino sector, by Mariam Tortola (Valencia)

-*Wednesday 13:45*, Standard Model, by Lorenzo Tancredi (Oxford)

-*Wednesday 16:15*, High-intensity probes of dark sector particles by Stefania Gori (Santa Cruz)

-*Thursday 13:00*, Geometries for scattering amplitudes, and beyond, by Livia Ferro (LMU)

-*Friday 13:30*, Latest developments in gravitational waves from early universe cosmology, by Daniel Figueroa (Valencia)

-*Friday 15:15*, **Dark matter**, **by Stefan Vogl (Munich)** 

## For local participants .

Local participants should :

- wear a mask in the Auditorium and
- sign up the attendance list at the beginning of each day.

Allowed seats are marked with adhesive tape. There should be 2 free seats around you.

There will be `real' coffee breaks for the locals.



Please remember to mute your microphone except when asking a question.

# Communication via Mattermost Channel

## Link sent to all registered participants



Fady Bishara 3:54 PM

Welcome to the DESY Virtual Theory Forum 2020!



Julia Harz 8:20 PM

# Please, do not forget to sign up for the dedicated session channels!

You can find them by clicking on "More..." in the Public Channels menu.



## Hertz public lecture by Helen Quinn.

## HERTZ **LECTURE**.

**DESY Lecture on Physics 2020** 



#### Mistakes on the way to a good idea:

VOLUME 16, NUMBER 6

We elaborate on an earlier discussion of CP conservation of strong interactions which includes the effect of menuformaticles. We discuss what hanness in theories of the quantum chromodynamics type when we include We elaborate on an earlier discussion of CP conservation of strong interactions which includes the eliect of pseudoparticles. We discuss what happens in theories of the quantum-chromodynamics type when we include weak and electromagnetic interactions. We find that strong CP conservation remains a natural symmetry if

pseudoparticles. We discuss what happens in theories of the quantum-chromodynamics type when we include weak and electromagnetic interactions. We find that strong CP conservation remains a natural symmetry if the full 1 paramotian processes a object 11/1) invariance. We illustrate our results by considering in detail a

weak and electromagnetic interactions, we find that strong CP conservation remains a natural symmetry if the full Lagrangian possesses a chiral U(1) invariance. We illustrate our results by considering in detail a model of (weak) CD population

Prof. Dr. Helen Quinn<sup>60</sup>  $\int d\phi \int d\phi \int d\phi^* \exp[\mathcal{E}(\phi\phi^*)]\exp[+\int d\phi^* (1-\gamma_5)]^{1/2}$ (SLAC National Accelerator Laboratory)<sup>1/2</sup>  $\int d^4x' \left[\overline{\psi} G^* \phi^* \left(\frac{1-\gamma_5}{2}\right)\right]^{1/2}$ Peccei-Quinn Symmetry. A tribute to

## 24 September 2020

18:00 h, talk will be live-streamed

https://webcast.desy.de

PHYSICAL REVIEW D

fusions and the circuitous path to their resolution. It is also an illustration of how the mathematical descriptions of physics, as Heinrich Hertz pointed out in reference to Maxwell's equations, not only provide solutions to the question or problem that led to their development, but can also suggest things that their developers did not even dream about.  $\mathcal{L}_{\rm eff} = \mathcal{L} + i\theta \frac{g^2}{32\pi^2} F^a_{\mu\nu} \tilde{F}^a_{\mu\nu}.$ This talk will also be a tribute to Roberto, emphasizing

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his attributes as a scientist, and as a person, that not Constraints imposed by CP conservation in the presence of pseudoparticles\* only were key to this work but that made him a such a successful scientist and leader of scientific institutions 15 sthroughout his career. K. D. Fecces and field K. Quinn Institute of Theoretical Physics, Department of Physics, Stanford University, Stanford, California 94305 (Deceived 31 May 1977)

I will talk about the development of the idea now known as Peccei Quinn symmetry, and its consequences. I will

use this work that I did together with Roberto Peccei to illustrate key features of how science progresses. While the problem we were addressing, and the answer we found for it are guite technical, this will not be a highly technical lecture. Rather it will be a story about our con-



**Heinrich Hertz** 

Hierarchy of Interactions in Unified G1857 Hamburg-Karlsruhe-Bonn 1894 H. Georgi, J. H. R. Quinn, and S. weinberg Lyman Laboratory of Physics, Harvard University, Cambridge, Massachusetts 02138 We present a general formalism for calculating the renormalization effects which make we present a general formalism for calculating the renormalization effects which make strong interactions strong in simple gauge theories of strong, electromagnetic, and weak strong interactions strong in simple gauge theories of strong, electromagnetic, and weat interactions. In an SU(5) model the superheavy gauge bosons arising in the spontaneous breakdown to abcorned interactions have reacted and a strong to the spontaneous breakdown to observed interactions have mass perhaps as large as 10<sup>17</sup> GeV, almost the Planck mass. Mixing-angle predictions are substantially modified.



Deutsches Elektronen-Synchrotron DESY A Research Centre of the Helmholtz Association

## Feedback welcome.

Feel free to contact members of the organising committee:

F. Bishara (DESY), C. Garcia Cely (DESY), J. Harz (TU Munich), O. Hohm (Humboldt U.), H. Kim (Weizmann), T. Konstandin (DESY), P. Liendo (DESY), G. Papathanasiou (DESY), R. Porto (DESY), F. Rühle (CERN), B. Shakya (CERN), G. Servant (DESY & UHH), S. Westhoff (U. Heidelberg). **PUBLIC CHANNELS** Cosmology & Astroparti... Feedback or even better use our `Feedback' channel on Mattermost: Off-Topic Particle Phenomenology Strings & Mathematical...

Town Square

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