

Jniversità degli Studi di Padova



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Staff H. Frellesvig M. Andreazzo D. Maitre at the Computational Frontiers 2023 . Brunello P. Salente QFSeptember the Gamputational Frontier

Mathem Amphitudes 2023 QFT at the Computational Frontier Speakersa, September 25-27, 2023

September Monter de Biesta` - Cariparo







Dipartimento di Fisica e Astronomia Galileo Galilei

Andrzej Pokraka Felix Tellander William Torres Bobadilla Johann Usovitsch

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Mathem Annalitudesa QFT at the Computational

> P. Salen**/Athen** Sept§m[Ser]25av23, 2023 Q. Sofiaat the UniverSityeof@adova

> > Speakers

Souvik Bera Jacob Bourjaily Ekta Chaubey Seva Chestnov Giulio Crisanti Giuseppe De Laurentis Lance Dixon Christoph Dlapa Matteo Fael

ClaudiaSterwokaBera Gaia Fortaeob Bourjaily Sir Federic Ekter Sphanobley Fe Gudrunstevian Ochestnov Wi Martijn ElidbonGrisanti Ja avid Mera avid Mera avid Meanwerppe De Lavin avid MeanwerDixon Ma ndMatheotEael Julia Crisanti Giuseppe De Laurentis To

Lance Dixon https://indico.dfa.upipd.it/e/ma2023 Christoph Diapa





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PADOVA :: the legacy of Giotto & Galileo

Philosophy is written in this grand book, the Universe, which stands continuously open to our gaze. But the book cannot be understood unless one first learns It is written in the language of mathematics, and its characters are impossible to understand a single word of it; without these, one wonders about in a dark labyrinth.

- to comprehend the language and read the letters in which it is composed.
- triangles, circles, and other geometric figures, without which it is humanly

Galileo Galilei, *il Saggiatore* (1623)



MATHEMAMPLITUDES :: at the core of the Labyrinth

Physics



Mathematics

Computer Science



Ampere's Law





 $\text{Link}(\gamma_1, \gamma) = +2$, $\text{Link}(\gamma_2, \gamma) = -1$, and $\text{Link}(\gamma_3, \gamma) = 0$



 $\oint \mathbf{B} \cdot d\vec{\ell} = -\mu_0 I.$

Integral decomposition by geometry

$$= \mu_0 \sum_k (\pm n_k) I_k$$

$$n_k = \operatorname{Link}(\gamma_k, \gamma)$$

Master Contributions

Gauss' Linking Number





Quantum Field Theory

Quadratic Relations

Differential Equations

Differential and Algebraic Geometry

> **Twisted Riemann Period Relations**

Pfaffian Systems

Differential & Algebraic Geometry



MATHEMAMPLITUDES :: the Program **26 Seminars & 2 Galilean Lectures** University of Padova

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Istituto Nazionale di Fisica Nucleare

Sezione di Padova





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