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# MATHEMAMPLITUDES 2023

## *QFT at the Computational Frontier*

G. Brunello  
G. Crisanti  
H. Munch

P. Salente  
S. Schiavo  
D. Sofia  
P. Zenere

Padova, *September 25-27, 2023*

Palazzo Monte di Pietà - Cariparo

● **Department of Physics and Astronomy “G. Galilei”**

[video-link-1](#)

● **Padova Urbs Picta :: UNESCO World Heritage 2021**

[video-link-2](#)



## 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 to comprehend the language and read the letters in which it is composed.

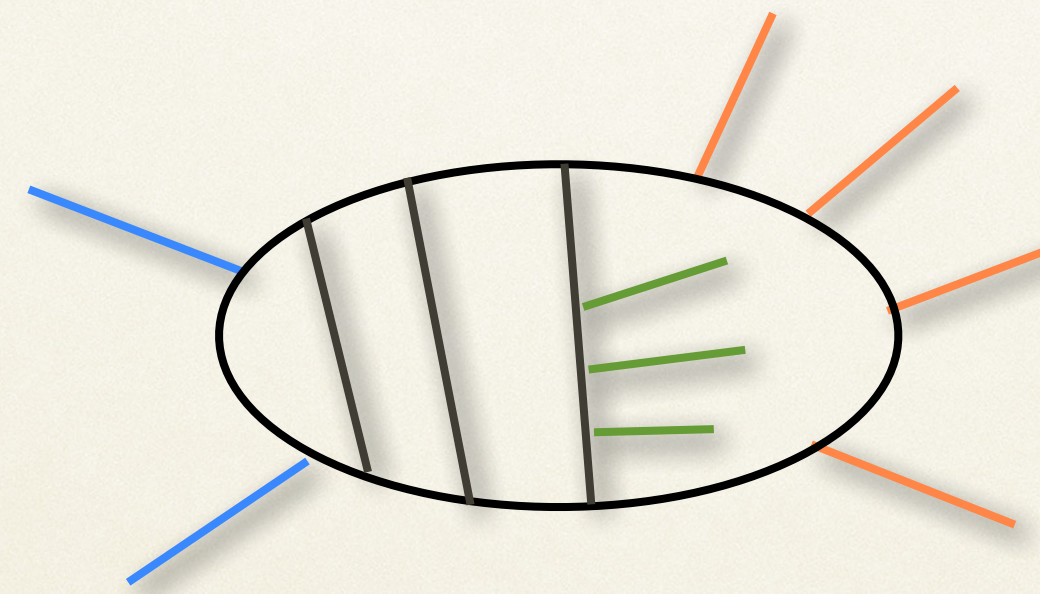
It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures, without which it is humanly impossible to understand a single word of it; without these, one wonders about in a dark labyrinth.

Galileo Galilei, *il Saggiatore* (1623)



# MATHEMAMPLITUDES :: at the core of the Labyrinth

Physics

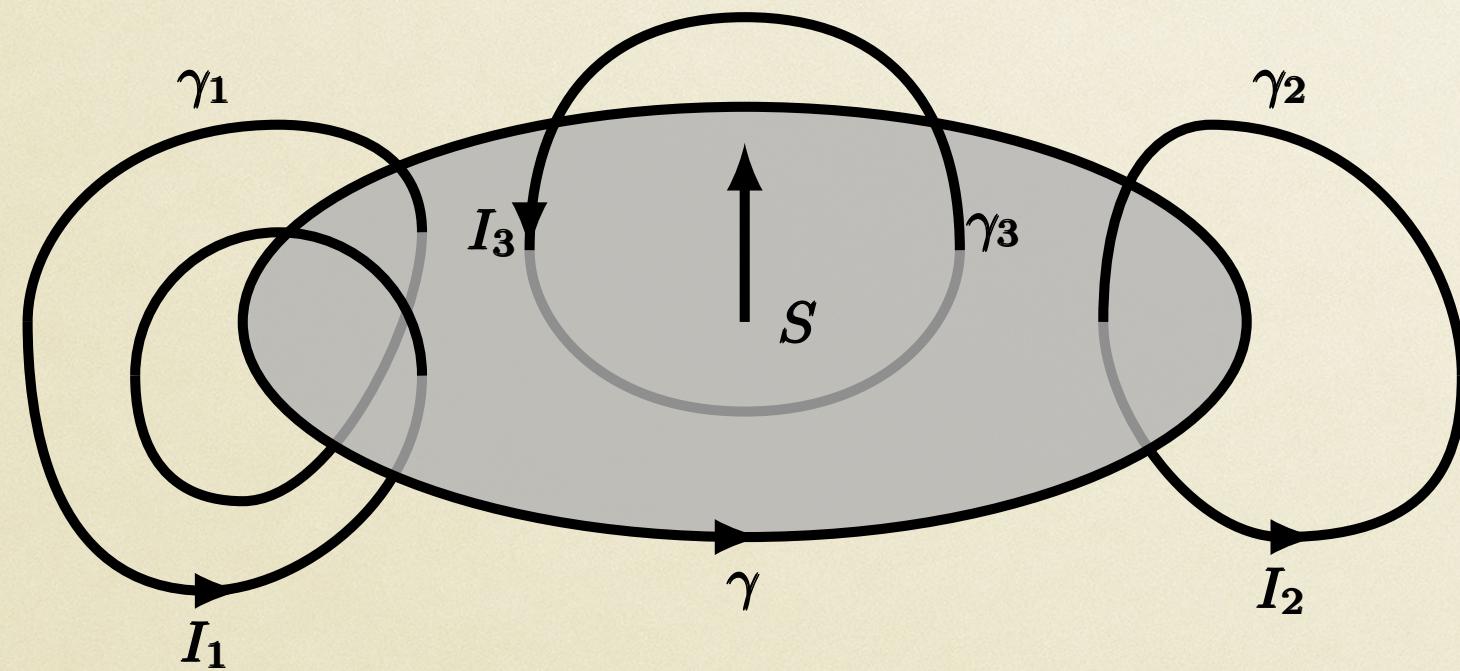
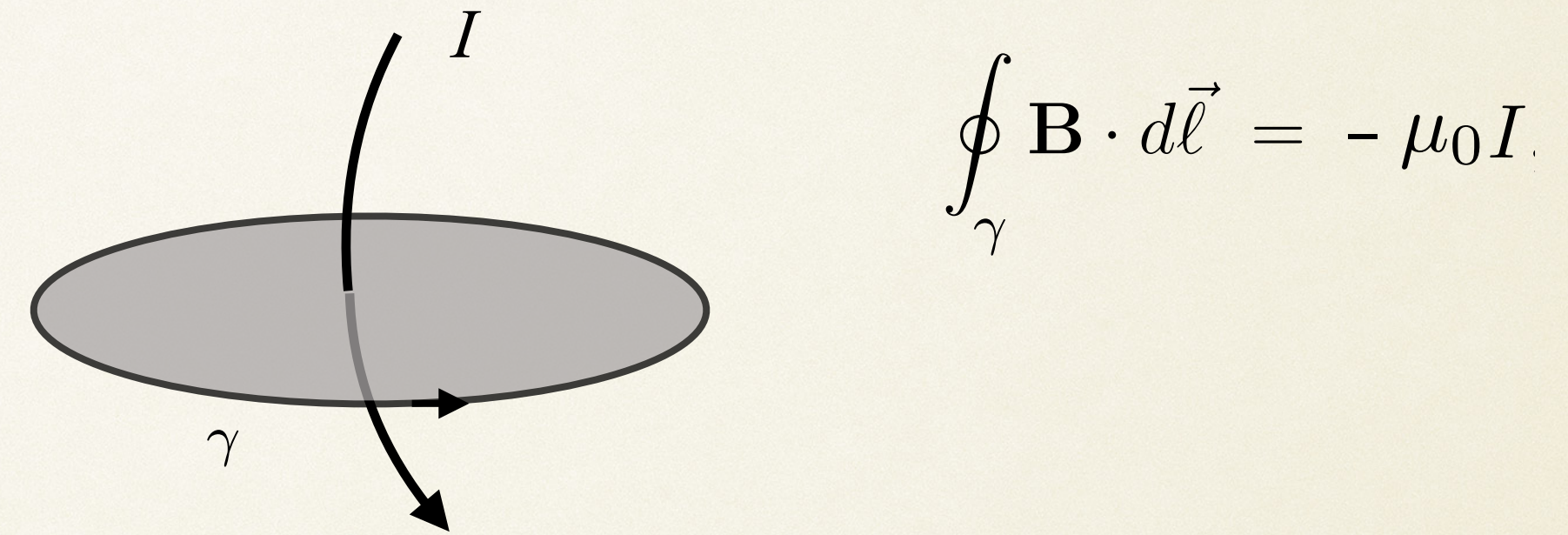
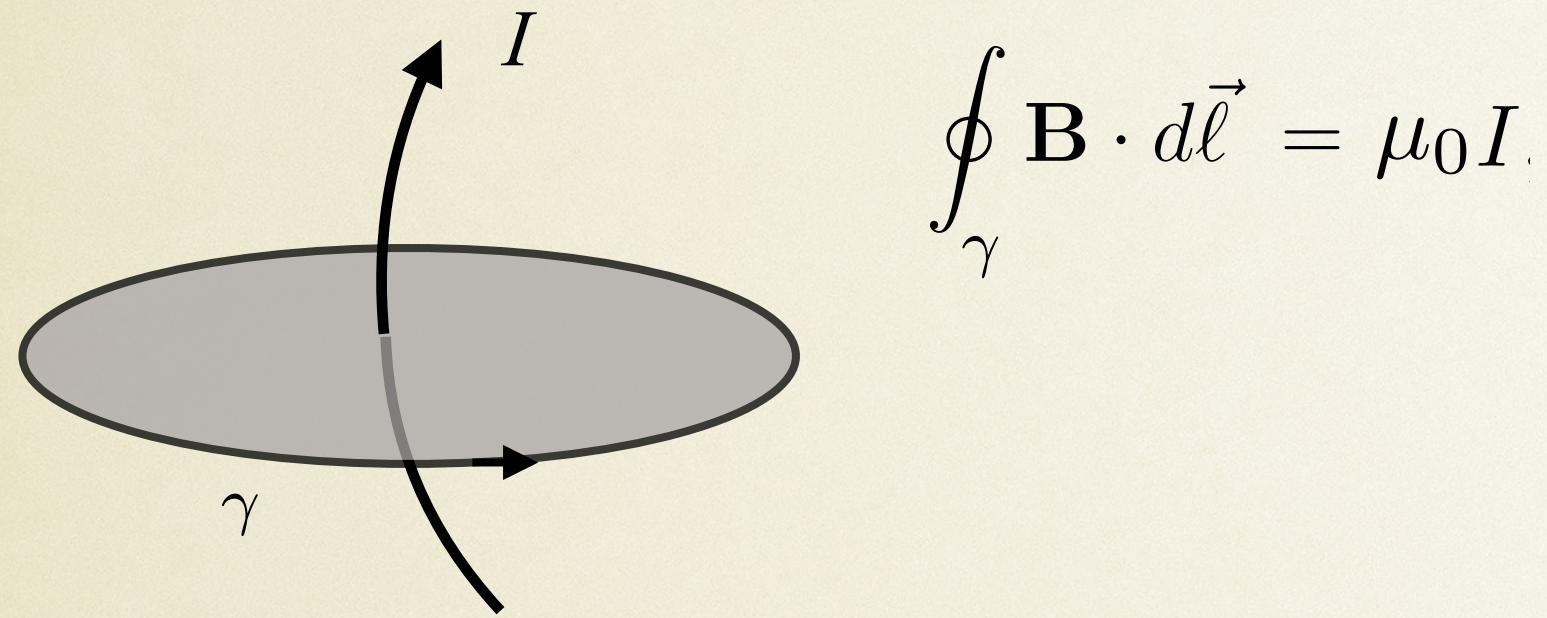


Mathematics

Computer Science



# Ampere's Law



- Integral decomposition by geometry

$$\oint_{\gamma} \mathbf{B} \cdot d\vec{\ell} = \mu_0 \sum_k (\pm n_k) I_k$$

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

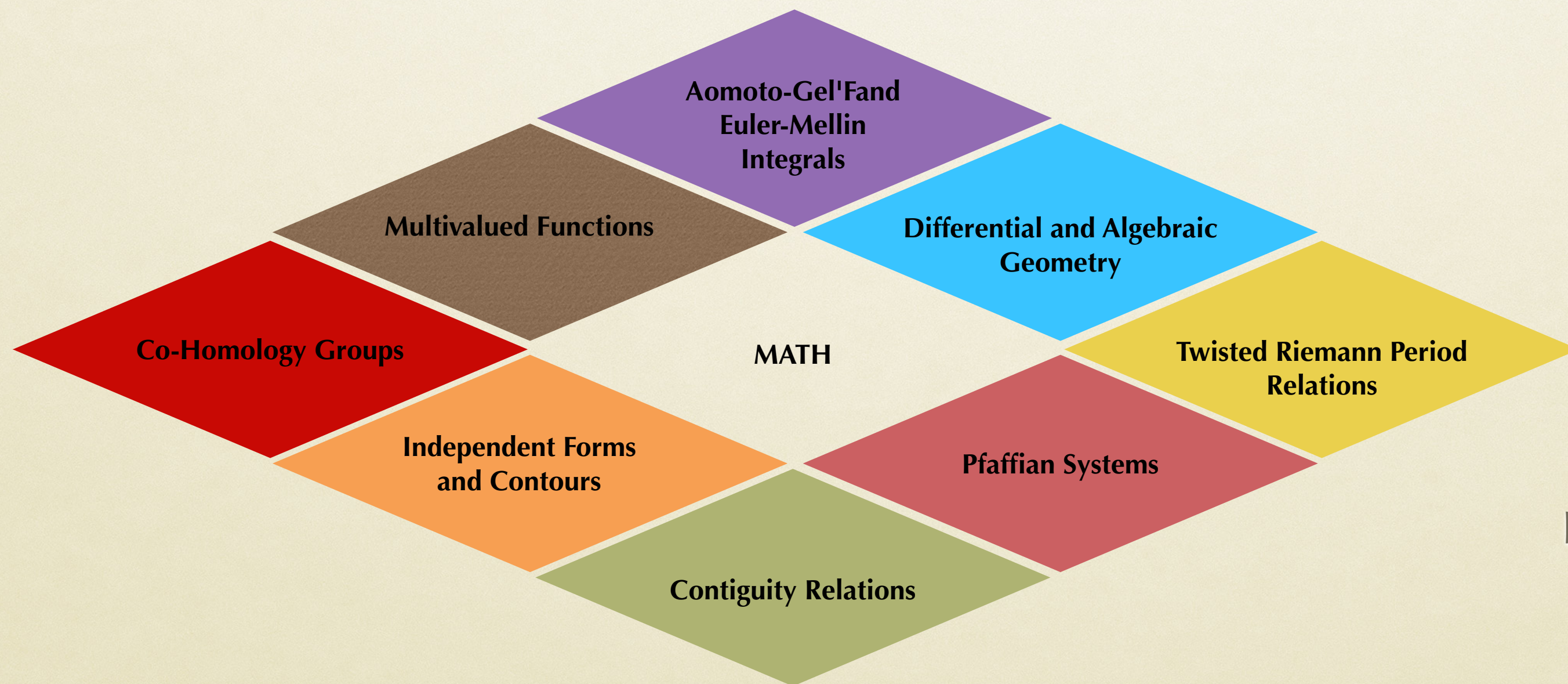
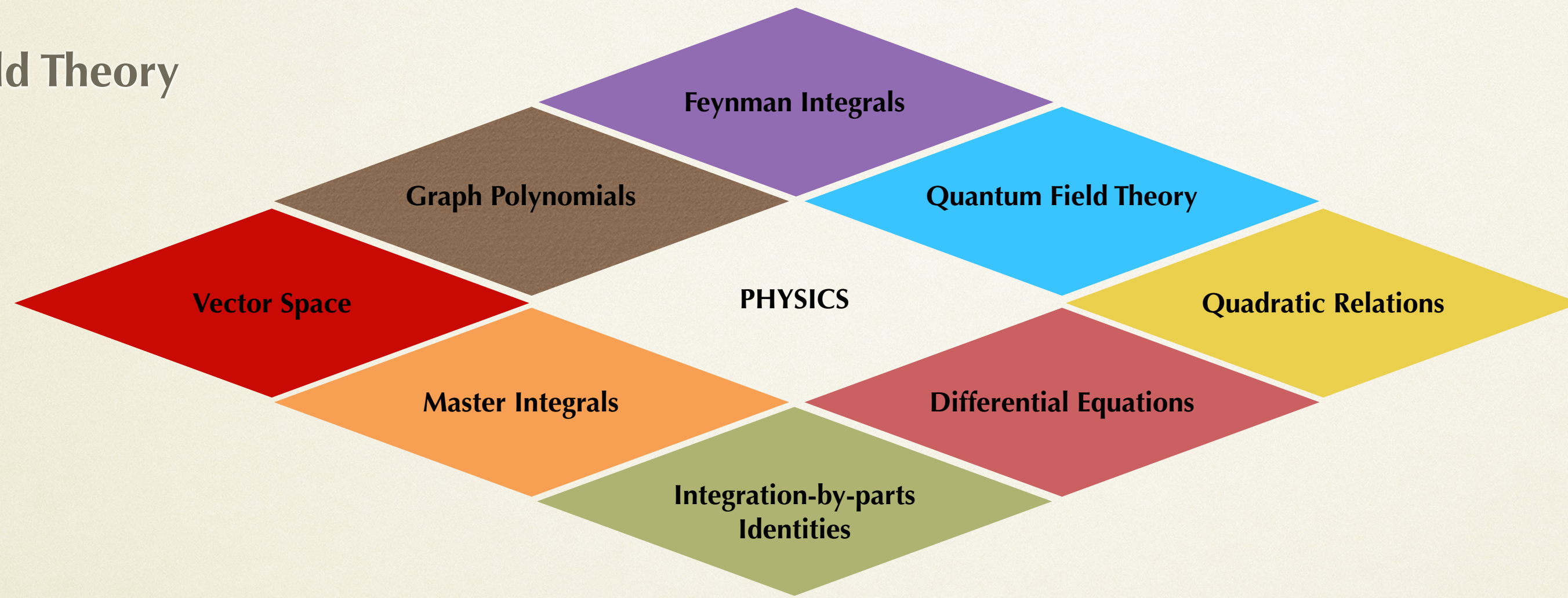
Master Contributions

Gauss' Linking Number

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



# Quantum Field Theory



Differential & Algebraic Geometry



# MATHEMAMPLITUDES :: the Program

26 Seminars & 2 Galilean Lectures



**Speakers**

Souvik Bera	Claudia Fevola	Andrzej Pokraka
Jacob Bourjaily	Gaia Fontana	Simon Telen
Ekta Chaubey	Federico Gasparotto	Felix Tellander
Seva Chestnov	Gudrun Heinrich	William Torres Bobadilla
Giulio Crisanti	Martijn Hidding	Johann Usovitsch
Giuseppe De Laurentis	Tobias Huber	Andreas Von Manteuffel
Lance Dixon	David Kosower	Mao Zeng
Christoph Dlapa	Xiao Liu	Yang Zhang
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**Welcome and Enjoy it!**