Contribution ID: **13** Type: **not specified**

Wall Crossing Structure from Quantum Phenomena to Feynman Integrals

Wednesday 3 September 2025 11:30 (30 minutes)

A growing body of evidence suggests that the complexity of Feynman integrals is best understood through geometry. Recent mathematical developments have shed light on the role of exponential integrals as periods of twisted de Rham cocycles over Betti cycles, offering a structured approach to tackle this problem in a wide range of cases. In this talk, based on arxiv 2506.03252, I will introduce these concepts and show how families of physically relevant integrals, ranging from exponentials to logarithmic multivalued functions, can be recast as twisted periods of differential forms over homology cycles. Focusing on the case of holomorphic exponents, I will use the Pearcey integral as a guiding example to present its explicit decomposition via thimble expansion, unveiling a geometric wall-crossing structure underlying the analytic continuation in parameter space. We will briefly explore how the generalization to multivalued functions provides the right framework to describe Feynman integrals in the Baikov representation, where the multivaluedness is governed by the logarithm of the Baikov polynomial. In this context, the thimble decomposition aligns with the decomposition into Master Integrals. I will highlight how the analysis of wall-crossing structure allows for a sharp count of independent Master Integrals (or periods), circumventing complications arising from Stokes phenomena.

Presenter: MASSIDDA, Anthony