Contribution ID: **65**

Type: **Oral Presentation**

Laplacian eigenmodes in twisted periodic topologies for new physics models

Laplacian eigenmodes in non-trivial topologies (e.g. having twisted periodicity) are important in constructing a complete picture of the physics at play within models that incorporate compact extradimensional spaces. Determining them analytically is generally unwieldy, and the existing standard numerical methods have limited ability as spatial dimensions increase and when computing higher-index eigenmodes is required. To determine the feasibility of using physics-informed neural networks to compute Laplacian eigenmodes, we apply them to three primitive test cases: the Möbius strip, the real projective plane ($\mathbb{R}P^2$) and the 3-torus (T^3) in Cartesian coordinates. The neural networks approach's potential performance beyond solving the simpler cases is estimated in terms of the approximation errors obtained by comparing with known analytical solutions.

Apply for student award at which level:

PhD

Consent on use of personal information: Abstract Submission

Yes, I ACCEPT

Primary author: NCUBE, Anele (University of Johannesburg)

Co-authors: Prof. CORNELL, Alan (University of Johannesburg); Prof. DEANDREA, Aldo (Université Claude Bernard Lyon 1); Dr HERBST, Rhameez (University of Johannesburg)

Presenter: NCUBE, Anele (University of Johannesburg)

Session Classification: Theoretical and Computational Physics

Track Classification: Track G - Theoretical and Computational Physics