Spectrum of the Laplacian on the Page Metric

Friday 6 June 2025 09:00 (15 minutes)

Computing the spectrum of the Laplace operator on a compact Riemannian manifold is a classic problem in mathematical physics. For this presentation, we consider the four-dimensional Einstein metric on the non-trivial S^2 -bundle over S^2 discovered by Page. A pseudospectral method is used to approximate the spectrum of the scalar Laplacian. We show our numerical results match well with recent estimates using geometric analysis techniques. We also analyze the spectrum of the Lichnerowicz Laplacian, which acts on symmetric two-tensors. This operator determines the stability of the Page metric under deformations. We show that there is a single negative eigenvalue, indicating instability, confirming a previous result of Young. A perturbative analysis is also done for the scalar case which matches the numerical results.

Author: SIEVERS, Kam To Billy (McMaster University)Presenter: SIEVERS, Kam To Billy (McMaster University)Session Classification: Mathematical Physics