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Maxwell Fields, Hidden Symmetries, and the Teukolsky Equation

Tuesday 2 September 2025 15:00 (20 minutes)

We study a class of symmetry operators acting on vector perturbations in the Kerr spacetime and employ them to generate new solutions of Maxwell equations. The operators are second-order in derivatives and are directly constructed from the principal Killing-Yano tensor. One of them reproduces a known result from the Debye potential theory, while the other yields a novel symmetry. When applied to a single mode solution, this new operator naturally reproduces the Teukolsky separation constant, indicating its role in the analysis of spin-1 fields in rotating black hole backgrounds.

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