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*Remarks on the  $s=1$  Teukolsky Equation*

The mathematical problem of stability of Kerr black hole spacetimes has been a major subject in mathematical and theoretical studies of the Einstein equations of general relativity. In the 1970s, a major breakthrough was achieved when Teukolsky was able to construct a master equation for the gauge-invariant ('extreme') Newman-Penrose scalars.

The structure of the linearized Einstein equations is such that the Teukolsky master equation does not admit a natural variational formulation for higher spin fields, such as the Maxwell and the linearized Einstein fields. As a result the energy methods are not directly applicable for this equation.

In this talk, we shall present the construction of a positive-definite energy for the Teukolsky variables for the Maxwell fields (spin  $s=1$ ) in the special case of axial symmetry. The origin of this positive-definite energy is a Hamiltonian principle and the construction is based on using certain 'twist' potentials as the main variables as opposed to the vector potential.