The Cauchy horizon singularity inside Kerr black holes LIOR M. BURKO, Georgia Gwinnett College, GAURAV KHANNA, University of Massachusetts Dartmouth — The numerical technology that allows for the careful evolution of linearized fields inside Kerr black holes and the study of their behavior approaching the Cauchy horizon singularity includes a number of interesting aspects. The latter include compactified hyperboloidal coordinates and foliation, mixed type hyperbolic-elliptic PDE, and initial data evolution where all equal-coordinate hypersurfaces are spacelike. We review the need for the numerical technology that allows for the solution of the spin-2 Teukolsky equation inside Kerr black holes, and discuss the main features thereof. We present new results about the numerical properties of the Cauchy horizon singularity and their correspondence with the predictions of perturbative analysis. We then discuss present directions of study, which include the sub-dominant azimuthal modes, approaching the Cauchy horizon singularity along timelike directions, approaching the Marolf-Ori ("outflying") singularity and the studying the fields along the Cauchy horizon.

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