

Gravitational Geometry and Dynamics Group Seminar

Wed., October 22, 2025, at 11h00.

Room: Sala Sousa Pinto and Teams ID: 348 249 442 092 6

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Electrically Charged Hyperboloidal Evolution

We present the Einstein-Maxwell-Klein-Gordon system in hyperboloidal slices, a recent formulation for extracting signals at future null infinity. As far as we know, this is the first time this setup is evolved with a common formulation like BSSN/Z4. Using hyperboloidal slices, contrary to other recent methods like Cauchy-Characteristic Matching, we can continuously reach future null infinity. With this system, we simulate how a charged scalar field behaves in flat spacetime and near a charged black hole.

We are further able to see the scalar field's quasi-normal modes and analyze the late-time power-law tail decays. Both phenomena were tested to see how they change with the electromagnetic coupling between the black hole and the charged scalar field. A comparison of previously studied analytical results to our simulations is shown. We also showcase the collapse of the charged scalar field into a Reissner-Nördstrom black hole.