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Visualizing the Curvature of Spacetime: Vortex and Tendex Lines of Head-On Merging Binary Black Holes SAMUEL RODRIGUEZ, GEOFFREY LOVELACE, Cal State Fullerton, GWPAC TEAM — Merging black holes and the gravitational waves they emit are important sources for gravitational-wave detectors like Advanced LIGO. When black holes merge, the spacetime around them becomes curved in a dynamic, turbulent way, like a storm in spacetime. In this project, we use analogs of electric and magnetic field lines to visualize the curved spacetime of merging black holes. A non-spinning black hole will produce tendicity; along tendex lines (analog of electric field lines), objects are stretched and squeezed. A spinning black hole will produce tendicity but will also twist the spacetime around it like a tornado, producing vorticity; along vortex lines (analog of magnetic field lines), objects are twisted. In this talk, I will present the first movies of vortex and tended lines from simulations of colliding black holes. Such movies will help build intuition of the dynamics of spacetime around binary black holes.

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