

1171-83-60

**A. L. Brosius\***, alexandra.l.brosius@nasa.gov, Greenbelt, MD. *Fractional linear transformations as a tool for visualizing extreme gravitational environments*. Preliminary report.

In April of 2019, the Event Horizon Telescope (EHT) Collaboration released the first image of the supermassive black hole. Since then, the EHT Collaboration has inferred remarkable magnetic topology and plasma constraints by comparing observations to theoretical models. The two main theoretical models occupy opposing computational extremes: the cost of crescent disk computation is trivial, and magnetohydrodynamic (MHD) simulations are very expensive. This presentation describes fractional linear transformations of a complex exponential function as a semi-quantitative compromise between crescent models and MHD simulations. Although the behavior of these transformations is well-understood for all curves, many conformal mapping applications only explore closed circles and straight lines. In this work, we show that transformations of nearly-circular and nearly-linear orthogonal contours bear a striking resemblance to messy features in MHD simulation still-frame images. After describing loxodromic representations of mass transfer between one black hole and its immediate environment, we use loxodromes to represent MHD simulations of mass transfer within a black hole binary system. (Received August 07, 2021)