

Abstract Submitted
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**Using the Beowulf Cluster to Analyze Wavefronts near Kerr
Black Holes¹** TIM WAITE, THOMAS KLING², Bridgewater State University —

The topic of my research project is wavefront singularities of light surfaces near Kerr (rotating) black holes. Studying these light surfaces will be done with the creation of parallel processing code intended to interface with our computer cluster. This code will make use of twenty CPU cores working in unison to calculate the positions of light surfaces as they approach our Kerr black hole. Mapping the path these light surfaces take as they approach will further our knowledge of similar physical systems, such as the central region of the Milky Way. One expected use of this project's results would be related to Sagittarius A*, the black hole at the center of our galaxy. NASA's proposed X-Ray Interferometry Telescope, MAXIM, would allow us to see many of our galaxy's distant features, one of them being the accretion disk surrounding Sag A*. These features of spacetime visible to us through MAXIM would be the same as the physics shown in this project. After successful calculation and computation, data from the project could be used to show what features NASA could observe around Sag A* if this telescope were to be built. This project comes in two parts: solving the differential equations that define how light moves in our spacetime, and then coding these equations to trace light surfaces across 20 CPU cores simultaneously.

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