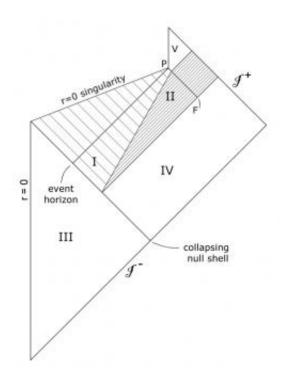


Colorado Programmer Develops New Black Hole Model

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Penrose diagram of an evaporating black hole spacetime. Each point in this diagram represents a 2 dimensional sphere. Spheres on the left edge have radius zero. Spheres on the right edge have an infinite radius. Time evolves from the bottom of the diagram to the top. Credit: Penrose Diagram

Newmerix Corp. Web programmer and amateur physicist David Ring has developed a new model for evaporating black holes. He explains this model in his article " A Linear Approximation to Black Hole Evaporation," which will appear in the August 7 issue of the Institute of



Physics' journal, Classical and Quantum Gravity.

Ring is a full-time web application architect at Newmerix Corp. and father of two, but he has a serious interest in Physics. He said "it took about four months of calculations" to mature his theory that describes the dwindling mass of black holes. "Even so, passing peer review may have been the hardest part. As an amateur, every step is thoroughly scrutinized."

A black hole is a region of space with such intense gravity that nothing, not even light, can escape. Many collapsed stars are thought to be black holes. Physicist Stephen Hawking shocked experts in the seventies by showing that these objects are not completely black. According to Hawking, they radiate away energy and mass very slowly.

Since then physicists have struggled to solve the difficult equations that describe the evolution of a black hole as its mass dwindles over time. Ring found that if he assumed the radiation rate was constant, and he divided the space around the black hole in a special way into a near region, close to the event horizon, and a far region, where the radiation is outgoing, he could solve the equations explicitly.

"Some interesting theorems were known using near and far regions and a boundary that would shrink as the black hole got smaller," said David Ring, who studied Physics at California Institute of Technology and Texas A&M University. "But it was a surprise that a constant radius boundary would make an explicit solution possible."



13,000,000,000 years. "Ideally we would like to model the end of a black hole's life" said Ring. "This is especially difficult since the curvature of spacetime is so severe that quantum gravity effects become important."

Ring hopes his experience and success as an amateur physicist will keep young people interested in physics. "Many young people get excited about understanding the origins of the universe and the way nature works at its most fundamental level, but they find career opportunities are very limited," says Ring. "There are no practical applications for these ideas, and it's difficult to find an organization willing to provide resources for study, but that does not mean amateurs have no future in physics. An amateur can still make an important contribution."

Ring himself makes his own salary at Newmerix Corp, developing Automate!Control, a software product based on Microsoft SharePoint and designed to manage enterprise application lifecycles. "Writing elegant code that is understandable to other programmers, fits into a web paradigm, and scales for the enterprise can be as subtle as General Relativity and Quantum Field Theory" says Ring.

The article is available online at <u>www.iop.org/EJ/toc/0264-9381/23/15</u>

Source: Newmerix Corp.

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