The Night Sky By Eric Erickson

Offered Title: Are Black Holes Black?

Sometimes, no, too frequently I'm looking for that file, that receipt, that phone number I had left on my desk and seen a million times. Now it's gone… where? I swear I have a tiny black hole in my office that makes stuff disappear. It must have traveled through a wormhole and popped up somewhere else in my house. OK, it's not so dramatic, I moved it and forgot.

Are black holes black? Yes, well mostly. Let's find out why.

Our friend, Albert Einstein predicted the formation of black holes - when neither the energy pressure, nor atomic structure of a star could hold up against its own gravity. The star collapses past atomic nuclei, into the never – never land called a singularity. Einstein did not like this and resisted his own theory. Of course, his prediction was later supported with evidence.

Starting with the singularity, an entity with no volume and infinite density, no one knows what goes on there. We think it has so much gravity that space-time is warped upon itself. Some theories suggest this extremely warped space-time generates what is called a worm hole, a short cut portal to other parts of our universe. Even if this is true, we currently do not know to exploit this extreme environment so don't hold your breath for an express shuttle to Andromeda.

Moving outward, past the singularity, we have some idea what is going on. This is a bubble of strongly warped space-time where electromagnetic energy has no path to escape, not even photons. Hence the name black hole.

Continuing outward there is a point where gravity diminishes enough to allow escape of electromagnetic energy. This is called the event horizon. For objects or particles outside of the black hole, the event horizon is the point of no return. One step past the event horizon and bye – bye, you're in the black hole. Your information is no longer part of the universe outside the black hole. If you survive maybe you shoot through the wormhole?

How do we detect black holes? Mostly from the affect they have on their surroundings. For example, looking at the center of our Milky Way galaxy astronomers have plotted numerous stars speeding in orbit around an apparently empty spot, probably a black hole.

Well, is a black hole black? Not entirely. There is radiation called "Hawking radiation" (as in Stephen Hawking) that emits from black holes. This radiation is thought to come from virtual particle pairs coming into existence just at the event horizon, where one particle falls in and the other escapes.

What's in the Sky?

Dust off your binoculars.

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Find Orion, with his four bright corner stars. Find his belt, the three bright stars in a diagonal line. Find his sword, the three dimmer stars lined up below his belt. Look at the middle star in his sword. Oh, it's not a star! It's a molecular cloud.