

# COSMIC EYES

By Mary Ann Taylor

As a child, Dr. Colleen Wilson-Hodge played soccer and watched the twinkling stars. She observed craters on the moon with a tiny telescope. In the third grade, she decided that she wanted to be an astronomer as she wanted to explore and discover.

Now she is all grownup and lives in Huntsville, Alabama with her husband, Mr. Andy Hodge and two cats. The big cat's name is Max and the small cat's name is Mini. Astrophysicist Dr. Colleen Wilson-Hodge works for the National Aeronautics and Space Administration, NASA, exploring the cosmos.

Each day she explores, and now she has discovered two stars in our universe no one had ever seen before. The stars she found are neutron stars called pulsars. A neutron star is a tiny star made up of material so heavy that a piece the size of a cube of sugar can weigh as much as a billion elephants.

September is her lucky month. She married Mr. Andy Hodge in September. On September 14, 1995, she discovered the first pulsar. Her most recent discover came three years later on September 7, 1998.

Room 248A, the conference room, is called the Bat Cave. A bat sign hangs on the cream colored wall above the scientist's heads as they sit around a big table and discuss projects of the day. Bats are everywhere. Plastic bats hang from the ceiling. Stuffed bats are perched on top of her computer. Does that mean Dr. Wilson-Hodge studies bats? No, she doesn't study bats, but she does use a special instrument called BATSE, pronounced *batsee*. BATSE stands for Burst

and Transient Source Experiment, to study objects or forms of energy in the universe.

Many objects that Dr. Wilson-Hodge studies don't give off visible light. BATSE sees gamma-rays, the highest energy portion of the electromagnetic spectrum, colors above the end of the rainbow. Colors of the rainbow are red, yellow, green, blue, and violet. BATSE monitors the sky for objects that are invisible to the human eyes and to telescopes that see only visible light.

"If we could see color beyond violet," said Dr. Wilson-Hodge, "we could see gamma-rays, but we can't."

"Dr. Wilson-Hodge, What did you see when you discovered the Pulsars?" I asked. She picked up a computer printout, a page filled with columns and rows of numbers.

"What do those numbers tell you?"

"A big star and a small star are in an orbital dance with each other. Both stars are bigger and hotter than the sun. The small star hangs out in orbit. The big star gets brighter and brighter and explodes as a supernova then collapses leaving an invisible, neutron star -- the pulsar," said Dr. Wilson-Hodge.

A neutron star has two magnetic poles, one on top and one on bottom. As the star spins it cast out beams of electromagnetic energy, gamma-rays, near the speed of light.

"The beams of energy rotate as the pulsar spins, like the rotating beam of a lighthouse," said Dr. Wilson-Hodge. "When the beam is pointed toward Earth, BATSE picks up the signal and records a pulse each time a beam of radiation sweeps across its path. Astrophysicists can calculate how fast the pulsar is rotating from the time between pulses."

BATSE is eight individual detectors mounted on NASA's Compton Gamma Ray Observatory. The 17-ton observatory has been orbiting Earth since 1991. It is one of the largest

scientific facility places in orbit by the Space Shuttle.

The detectors pick-up gamma-rays, energy in the form of invisible light. Inside each detector is a large sodium iodide crystal called a scintillator. The crystals change gamma-ray energy into visible light and measure its strength. This information then goes to a communication satellite, and on to NASA's space center. Computer software translates the data into graphs and numbers.

“What do the graphs and numbers tell you, Dr. Wilson-Hodge?”

“If the numbers remain steady or increase for two or three days, I know that BATSE has truly picked up a flux of gamma-rays, a massive flow of invisible energy. A star has exploded and collapsed and a neutron star is left doing an orbital dance with its companion star.”

Dr. Wilson-Hodge reads the numbers and graphs and sees the stored knowledge in her brain. Knowledge that tells her far, far away above Earth a cosmic show is taking place in the universe.

“When I think I've found something new, I can't wait to get to work to find out more about it,” said Wilson-Hodge. “I'm like a kid waiting to open a Christmas present.”

NASA astrophysicist Dr. Colleen Wilson-Hodge is still a kid at heart. She and her husband play a football-like sport played with Frisbees. Max and Mini have the run of the house while she works at the Bat Cave. She likes to rock climb and explore canyons.

When asked to search her heart for a message to leave with her young readers, this is what Dr. Colleen Wilson-Hodge said, “Don't worry if you don't know what you want to be yet, childhood is the time to learn what you like and to explore what really excites you, because someday when you pick a career you want it to be fun.”

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