

Astronomers crack exploding star mystery

TUCSON, Ariz. (AP) — Aided by supercomputer calculations, astronomers are finally solving the puzzle of what causes supernovae, powerful exploding stars that create the elements that make life possible.

Astronomers have been stymied for decades in explaining what makes very large stars explode at the end of their lifetime. The process was simply too complex for chalkboard formulae.

But new supercomputers, capable of running millions of calculations a second, have enabled astronomers to create

mathematical models that explain the microsecond-long changes that occur as a star 10 times the size of the sun suddenly goes supernovae.

In presentations on Monday to the national meeting of the American Astronomical Association, teams of astronomers showed computer-driven graphics of the processes happening inside a supernovae.

With the computer calculations, the astronomers cranked in convection and two-dimensional action within the explosion and found that filaments of cold gas

streamed back toward the star's core, became superheated and then exploded outward. All within a fractional second.

"Matter simultaneously streams toward and away from the core and such circulation of material happens to be crucially important for the explosion," said Marc Herant, an astrophysicist at the Los National Laboratory.

Supernovae originate from stars eight to 10 times the size of the sun. After shining for millions of years, the star's nuclear fuel is exhausted and there is not enough outflowing heat to keep the star's mass

suspended above the core. The star collapses inward and the core, about the size of the sun, shrinks within seconds to about 20 miles. Temperatures soar to billions of degrees and neutrinos, a type of subatomic particle, erupt outward.

Gas in the shell, streaming inward because of the collapse, is heated by the neutrinos and then erupts outward, rather like bubbles rising from water being heated on a stove.

Within a fraction of a second, the gas is heated to a point that it explodes, blowing off the outer layers of the star.

5 people killed in crash in Arkansas on Monday

MENIFEE, Ark. (AP) — Truck drivers crossing Arkansas under clear skies before dawn Monday ran into a "wall of fog" that caused a nine-vehicle pileup. Five people were killed.

Truckers issued warnings on their citizens band radios that prevented more vehicles from plowing into the burning wreckage on Interstate 40, about 30 miles northwest of Little Rock.

"When we got out, all we could hear was screaming and hollering," said John Oakes of Pearisburg, Va., a passenger in a truck that missed the pileup. "They were screaming bloody murder."

Eight tractor-trailers and a minivan were involved in the accident, police said. The van wasn't found until nine hours after the 2 a.m. accident, in a heap of smoldering 18-wheelers.

"We believe everyone is accounted for," said Ted Gipson of the Office of Emergency Services in Conway County. "There is still a pair of small shoes over there that we're concerned about."

The dead were identified as truckers Delbert Costa, 53, and Gregg Lawrence, 39, Fort Smith men riding in the same truck; trucker William Lewin of Searcy; trucker Donald Otto Salch, 31, of Woodsboro, Texas; and telephone company employee Jeff Satterfield of

Little Rock. Another trucker was treated and released from a hospital.

Nearly all identifying marks had been burned from the trucks, making identification of the victims difficult. Two of the tractor-trailers were hauling cattle, and injured animals limped amid emergency workers.

Two trucks were carrying hardware, including cans of paint that periodically exploded. Other trucks were carrying scrap iron, lumber and newsprint.

"We were coming down the road and all of a sudden we ran into a wall of fog. I hit the left lane and hit the brakes," said truck driver Walt Burns of Dublin, Va. His truck stopped in the median.

"It was clear. The next thing you know — pow! — zero visibility," Gipson said. Burns broadcast a warning to other truckers, then made a futile attempt to extinguish the flames with a fire extinguisher. "It was like taking a jackknife to a machine-gun fight. There was just nothing we could do," Burns said.

National Weather Service forecasts had said that patches of fog were possible along the Arkansas River Valley overnight. Forecaster Greg Meffert said that conditions didn't warrant a warning of hazardous travel.

Clinic gunman held without bail

BROOKLINE, Mass. (AP) — The man accused of opening fire on two abortion clinics, killing two women and wounding five other people, was ordered held without bail today after pleading innocent to murder charges.

In addition to the two murder charges, John C. Salvi III, 22, entered the innocent plea to five counts of armed assault with intent to murder.

In arguing for no bail, Norfolk County Assistant District Attorney John Kivlan said Salvi had planned the killings for months, purchasing weapons and making himself familiar with the layout of abortion clinics. He also noted that one of the two receptionists killed, Lee Ann Nichols, had been shot nine times.

Kivlan described the shootings as acts of "extreme atrocity and cruelty."

J.W. Carney, Salvi's court-appointed attorney, asked for bail, but District Court Judge Herbert Goodwin denied the request. The judge said he would hear arguments for the setting of bail at a later date.

A pretrial hearing was set for Feb. 1.

Salvi stared vacantly throughout today's hearing, his eyes often cast down.

Neither prosecutors nor the defense would comment on possible strategies in the case, which is being investigated by a grand jury.

In particular, Carney would not comment about Salvi's possible use of an insanity defense.

"I think that this case will turn to be much more complicated than people look at it now," Carney added. "He's had extraordinary beliefs based in large measure on his sincerely held religious feelings."

There were several pro-choice advocates outside the courthouse, but there were no demonstrations by any anti-abortionists.

Meanwhile, the clinics where the shootings occurred were starting to see patients again. Preterm Health Services told patients seeking gynecological exams to come in today, but was not yet offering abortions. The other clinic attacked in this Boston suburb, Planned Parenthood, reopened Friday behind metal detectors and extra guards.

Salvi, a devout Roman Catholic and student hairdresser from Hampton, N.H., allegedly killed the clinics' receptionists and wounded five others Dec. 30. Salvi has already pleaded innocent to federal firearms charges in Boston, and is charged in Virginia with shooting out the glass doors of a building where abortions are performed in Norfolk, Va., on Dec. 31. He was arrested shortly thereafter.

Most of the staff and volunteers at Preterm Health Services have a "spirit of renewed dedication," said a spokeswoman, Sue, who would not give her last name for security reasons. Still, "there are some who may be taking some days to think about whether they'll return,"

she said.

Sue wouldn't say when the clinic would resume abortions.

Planned Parenthood already has performed abortions, officials said. Workers were scared, but the patients appeared to be reassured by the increased security, said Nicki Nichols Gamble, president of the Massachusetts League of Planned Parents.

At Sunday Mass, the Rev. J. Dale of St. Pious X Catholic Church in Norfolk urged his parishioners to stop protesting outside the Hillcrest Clinic, where the Virginia shooting occurred, or taking part in any demonstrations "which might be perceived as supportive of the violent elements in the pro-life movement."

Cardinal Bernard Law in Boston also called for a halt to clinic protests in response to the killings. But in New York, Cardinal John O'Connor said during Sunday Mass that nonviolent prayer vigils outside clinics should continue.

Also Sunday, six members of Congress demanded increased federal funds to protect abortion providers and investigate violent anti-abortion groups.

In a letter to Attorney General Janet Reno, the group called for an investigation of 22 organizations whose members signed a petition referring to the murder of abortion providers as "justifiable homicide."

The petition was circulated by Paul Hill, convicted of killing a doctor and his escort at a Pensacola abortion clinic last July.

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