

ASTRONOMY

New Stars Are H-Bombs

Theory proposes that part of a large cloud of hydrogen gas becomes unstable and a star is born in a cosmic explosion that hurls non-ionized gas outward at 12 miles per second.

► STARS BEING born are cosmic hydrogen bombs, exploding in dense interstellar clouds, according to a new theory on the results of star formation presented to the American Physical Society meeting in New York by Dr. Malcolm Savedoff of the University of Rochester, Rochester, N. Y.

He drew a mathematical picture of stellar birth within one of the vast clouds of hydrogen gas that dot the reaches of space between stars. Dr. Jan H. Oort of Leiden Observatory, The Netherlands, and Dr. Lyman Spitzer of Princeton Observatory, Princeton, N. J., proposed the ideas that triggered Dr. Savedoff's investigation of "the gas dynamic effects of star formation."

Dr. Savedoff suggests that in a big cloud of hydrogen gas, part of the cloud becomes unstable and a star is formed. Ultraviolet radiation from the star ionizes the gas immediately around it. This ionized gas pushes the neutral, or non-ionized, gas around it away at the high velocity of 12 miles per second. Speed of sound in air being about one-fifth of a mile per second, the velocity of this expanding gas is at least 60 times as fast as present-day jet planes.

In front of the expanding gas is a shock wave, an invisible wall rushing ahead in warning of the high pressures behind it. Beyond the shock wave is a region, still within the great hydrogen cloud, that does not know anything is going on.

The effect can be likened to the difference between lighting a match and a firecracker. The match is designed to burn slowly, a little at a time. When a firecracker is set off, a comparatively large amount of matter is excited very quickly, resulting in an explosion. Dr. Savedoff's cosmic bombs are hydrogen firecrackers of gigantic proportions exploding now.

Best evidence for current stellar formation, Dr. Savedoff told a symposium of the Physical Society's division of fluid dynamics, is the fact that the brightest stars radiate energy so furiously their fuel supply, which is hydrogen, would be exhausted in ten million years.

Recent studies of the apparent motions of stars have revealed groups that seem to be expanding from a point, and the age of such stellar clusters is estimated at only two million years. Currently, the age of the universe is thought to be about five billion years. These infant stars are bright blue stars, a million times brighter than our sun, found in what astronomers call "O" associations, always seen close to dense interstellar clouds.

Dr. Savedoff worked out this theory in collaborating with John Greene, who is

studying for his Ph.D. at the University of Rochester.

When a star is formed outside of a hydrogen cloud, Drs. Spitzer and Oort have proposed that ionization of gas on the side of the cloud close to the intense stellar ultraviolet light leads to a rocket-like effect, the cloud losing protons and electrons from its surface, and gaining momentum. Large velocities would result when a large fraction of the original mass of the cloud is thrust away.

Dr. F. Kahn of Manchester University, England, after further investigation concluded that this "rocket" effect would occur.

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ENGINEERING

Fight Machine Noise By Adding More Noise

► ENGINEERS HAVE taken a roaring electric power transformer and quieted it down by adding more noise.

This feat, disclosed in New York at a meeting of the American Institute of Electrical Engineers, was made possible by the phenomenon of wave cancellation. Two identical sound waves can completely wipe each other out when they are out of phase, that is when the crest of one corresponds to the valley of the other. Thus, under certain conditions two noises, no matter how loud they are, can be combined to produce complete silence, at least theoretically.

The experiment with the noisy transformer has not gone that far, W. B. Conover and R. J. Ringlee of the General Electric Co., Pittsfield, Mass., explained, but they have produced what they called a "beam of silence."

The beam eliminates much of the noise from the transformer in a 30-degree angle. They called the effect "astonishing" and said that once the electronic adjustment had been made they could turn the transformer noise off or on at will merely by switching their loudspeakers on or off.

The equipment, they said, was much cheaper than conventional sound barriers and it promises to be "by far the most economical and satisfactory solution for noise problems where a limited area only is involved."

The direction of the "beam of silence" could be changed by adjusting the synco-pated phase of the loudspeaker noise. It was pointed out, however, that although noise is reduced in one direction there is more noise in other parts of the room.

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