

Trigger Happy Star Formations

From recent discoveries made by two of NASA's Great Observatories comes new insight into how stars are created. Large nebula's scattered all around our galaxy, act as incubators for newborn stars to ignite and grow. However astronomers still face questions as to what exactly causes a star to light up.

Hello, I'm Marc Helou

[Slated Intro]

While nebula's are certainly some of the most beautiful structures in space, they are also the center of stellar life. Astronomers still have questions about what internal or external forces can trigger the formation of a star inside of a nebula. With the help from two of NASA's Great Observatories, the Chandra X-Ray Observatory and the Spitzer Space Telescope, researchers have been able to take a great step forward in solving the puzzle of star formation.

In order to learn more about these triggers, astronomers looked towards the Cephus B Nebula. Located about two thousand four hundred light years from our solar system, Cephus B consists of primarily hydrogen clouds. In and around these large clouds, the stars range from a few million years old, to less that a million years young. This wide spectrum of stellar age is very important, because it gives astronomers the opportunity to see how the environment that these stars are growing up in may also have affected their creation.

There are several theories to explain star formation. One is that gravity gets the upper hand inside the nebula, causing massive cloud structures to eventually collapse back into themselves, the increased pressure then triggers stars to ignite. The other two theories mainly rely on an external force as the trigger for a nebula's collapse.

The first theory is that when a nearby star goes Nova or Supernova, the immense shock-wave created would gather up and compress the dust and gasses of a nearby nebula forcing a gravitational collapse and potentially creating hundreds of new stars in the process. The second theory is that if there was a large star nearby, the amount of radiation being generated would cause the dense interiors of a nearby nebula to compress and ignite while blowing away the lighter exterior.

Konstantin Getman from Pennsylvania State University, one of the lead astronomers of this new research, has said that previously astronomers had thought that radiation or nova triggers were a relatively rare occurrence. This general consensus was because these specifically triggered formations had only been seen in very small nebula populations of only a few dozen stars. But these new results, Getman and his colleagues admit, are showing these previous beliefs to be likely wrong.

The Cephus B nebula is at such an orientation that it gives astronomers a first rate view into the what processes are triggering the stars creation. With the Chandra X-Ray observatory, astronomers are primarily able to see the young stars in and around the nebula. These stars are easily viewed because they have very turbulent interiors, generating strong magnetic fields which in turn create strong X-Ray signatures for Chandra to view.

With the Spitzer Space Telescope, astronomers are able to get a closer look at these young stars inside the cloud specifically in order to see if they have formed orbiting clouds of dust and gas. These clouds, known as protoplanetary disks, only exist around these very young stars, enabling astronomers to better determine the age of any particular star.

The findings from this combined study shows that the new stars born in the Cephus B nebula are mainly being triggered by one massive star that resides outside of the main cloud. The radiation generated by this star is causing waves of star formation across the entire nebula, slowly revealing more newborn stars, and results are exactly as what predicted scenarios have shown. Now, thanks to the combined efforts of the Chandra X-Ray Observvatory and the Spitzer Space Telescope, astronomers have a better understanding of how a nebulas nearby environment can help to create new stars.

For the Spitzer Science Center, I'm Marc Helou.

[Slated Outro]