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ASTRONOMY

Over-the-hill star may help pinpoint universe's age

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BY TOM STATLER

With no eyewitnesses to the big bang, astronomers sometimes are criticized for claiming to know the age of the universe.

But three lines of evidence all point to an age of about 13.7 billion years.

First, we can see how fast galaxies move apart from one another, and we can work backward to calculate when that separation started.

Second, we understand what powers stars and how long it takes different types of stars to burn out. Because we see stars dying now after living for billions of years, there must have been stars forming billions of years ago.

Third is the decay of radioactive elements. These naturally occurring substances change into other elements at known rates, so measuring their abundance in rocks can tell us how long it's been since those rocks formed.

A new angle is to focus on radioactive elements, not in rocks, but in stars. And a study published in the May 10 issue of *Astrophysical Journal Letters* reports on a genuine star geezer, HE 1523-0901.

Astronomers used one of the world's largest telescopes to get a precise spectrum of the star's light, in which every element in the star leaves a unique atomic fingerprint.

The astronomers measured the trace amounts of uranium, thorium and other heavy metals in the star. Matching the known decay rates led them to conclude that HE 1523-0901 is 13.2 billion years old.

Only very large stars make uranium, and only in their centers. The fact that a modest-size star could have formed with uranium at its surface means that some other very massive star must have formed, lived, died and exploded first.

All this must have happened very early in the history of the universe.

News reports on this discovery have focused on the excitement about finding the "oldest star." But there's really a 2.7-billion-year margin of error. In other words, there is a 67 percent chance that the age is between 10.5 billion and 15.9 billion years.

The astronomers are upfront about this. But we should all take this as a reminder to insist on knowing the margin of uncertainty in any claim.

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