

New simulations suggest runaway stars may be outcasts from binaries

18 November 2011, by Bob Yirka

(PhysOrg.com) -- For at least half a century, astronomers have been perplexed by so-called runaway stars; big monsters that hurtle around galaxies at some thirty kilometers per second without apparent reason. Now however, astrophysicists Michiko S. Fujii and Simon Portegies Zwart describe in their paper published in *Science*, how they believe that the big stars get their speed as a result of being hurled out and away from binary star couplings that occur within the centers of clusters of stars.

The two suggest that on occasion some big stars move close enough to binaries (paired stars) that they get pulled into their [gravitational field](#), resulting in an unbalanced state as the trio moves awkwardly through space. After some time passes, the big star gets the boot and as a result of the buildup of energy created between the three, is sent hurtling out into space, becoming a runaway star.

Such stars have been the focus of much attention as they travel so much faster than all the other stars around them. Most in the [Milky Way Galaxy](#) by contrast plod along at a measly five kilometers per second, so it's not difficult to see why the speedsters would draw so much attention. Prior to this research, some suggested the big stars got their speed from being near another star that exploded. Other's theorized that they'd maybe simply paired with another star and the two began moving around one another at a faster clip, similar to ball room dancers. Though in this case, the two would have wound up flinging one another apart in opposite directions in their grand finale.

To back up their theory, Fujii and Zwart built a computer simulation of star clusters and found that over time each [cluster](#) did indeed include binaries that attracted other stars that were eventually sent packing by the original two. The researchers believe this proves that the majority, if not all runaway stars became such due to being rejected

as a temporary third mate for binaries.

This new thinking came about when two stars last year were spotted speeding away from a dense group of star clusters believed to be less than two million years old, which seemed to fly in the face of the exploding partner idea, as such stars aren't thought to explode until reaching at least three million years of age.

At any rate, as time passes, it should be easy enough to prove this new theory; all scientists have to do is trace back the trajectories of speeding [stars](#) to see if they came from identifiable binaries.

More information: The Origin of OB Runaway Stars, Published Online November 17 2011. *Science* DOI: 10.1126/science.1211927 [www.sciencemag.org/content/ear ... 1/16/science.1211927](http://www.sciencemag.org/content/ear.../1/16/science.1211927)

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