ciently tightly that it is unlikely that they will be collisionally disrupted, the component stars almost certainly will eventually merge into a single well-mixed star. Also, given that the timescale for such stellar coalescence is less than the blue-straggler lifetime (1–7×10^9 yr) it follows that many, if not all, of the other blue stragglers in NGC5466 may be coalesced binary systems. Indeed the populations of blue stragglers in both NGC5466 and NGC5053 are more centrally concentrated than those of red giants of the same luminosity, which has been attributed to differences in their masses — on average 1.2 and 0.75 $M_\odot$, respectively. Pulsationally unstable blue stragglers in the 'Cepheid instability strip' (SX Phe stars) are also found to be relatively massive.

Segregation

In the case of 47 Tuc, the strong radial gradient in the number density of blue stragglers is further evidence of mass segregation, indicating that these stars too are more massive than the general population. In this sense they resemble those in NGC5466 and NGC5053. But were they formed by the same mechanism? Because of the extremely high density of stars in the centre of 47 Tuc, it would be surprising if the blue stragglers identified by Paresce *et al.* were not formed as a result of stellar collisions. According to Hills and Day[6], about 1,600 binaries should have formed in 47 Tuc over its lifetime as a result of interactions between single main-sequence stars. Such single–single collisions would produce merged stars which would tend to have a smaller velocity dispersion than the background population and so become centrally concentrated, as is observed with the blue stragglers. It has also been argued[9] that any primordial binaries in the core of 47 Tuc would have been broken up during the cluster's 15×10^9-yr history.

On the other hand, less than one single–single collision is predicted to have occurred in the low-density clusters NGC5053 and NGC5466. For this reason, the blue stragglers in these low-density clusters are more likely to be primordial binaries, or to have been formed as a result of binary–binary interactions which should form new binaries more efficiently than single–single collisions, regardless of the system density[10]. The conclusion of Paresce *et al.* is that the blue stragglers in 47 Tuc probably formed through stellar collisions "between single stars and binaries, or between two binaries", followed by coalescence and subsequent settling to the centre of the cluster. It remains to be seen which of single–single, single–binary and binary–binary collisions is the dominant mechanism.

The recent discoveries[1,2] of blue stragglers in the cores of the dense clusters 47 Tuc and NGC6397 complement the discoveries within the past decade of cataclysmic variables and millisecond pulsars (both of which are binary systems) and low-mass X-ray binaries in the cores of the highest-density globular clusters. Clearly the rich diversity of binary types that are present depends on the evolutionary histories of the stars as well as the dynamical histories of the clusters, and as such all of these systems provide an invaluable record of the past activity of the parent cluster.

It will be important to follow up the new results with further observations to establish the blue stragglers' physical characteristics, in particular identifying possible eclipsing binaries, SX Phe stars and spectroscopically peculiar stars among them, for comparison with their counterparts in the low-density globular clusters. In addition, more fields will have to be observed in 47 Tuc to determine whether the distribution of its blue stragglers is centrally peaked or falls off gradually. And of course, the cores of even-denser globular clusters, such as the relatively nearby systems M30 and M15, have yet to reveal their blue stragglers.

Finally, a critical test of the mixing hypothesis was recently proposed[11] for the blue stragglers in old open clusters. This test would be equally applicable to those in globular clusters. The isotope ^{7}Li is quickly destroyed at temperatures exceeding 2×10^6 K, a temperature easily achieved in stellar interiors. If the blue stragglers are 15×10^9-yr-old single stars of mass 1.2 $M_\odot$, whose lifetimes have been extended by mixing, lithium-depleted material would have been brought up to the stellar surface. The detection of a strong neutral lithium line at a wavelength of 670.7 nm in the absorption spectra of blue stragglers would suggest that mixing is not at work. But the apparent faintness of even the brightest globular-cluster blue stragglers precludes that test being made yet. □

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