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Glow-in-the-dark globular clusters: modelling their multiwavelength lanterns

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Abstract content
   (Max 300 words)

Globular clusters (GCs) are astronomical tapestries embroidered with an abundance of exotic stellar-type objects, including ancient metal-poor stars, planetary nebulae, white dwarfs, low-mass X-ray binaries (LMXRBs), RR Lyrae variables, blue stragglers, cataclysmic variables, and possibly even central black holes. In addition, their high age promises a rich harvest of evolved stellar products, while the deep potential wells and high mass densities at their centres probably facilitate the formation of multiple-member stellar systems via increased stellar encounter rates. The ubiquity of GC LMXRBs, thought to be the progenitors of millisecond pulsars (MSPs), furthermore sets the stage for yet another interesting cluster subpopulation. In addition to the many GC radio pulsars and X-ray counterparts that have already been discovered, Fermi Large Area Telescope (LAT) recently unveiled the first gamma-ray GC pulsar (PSR J1823-3021A). The first observations of GCs in the GeV and TeV bands furthermore created much excitement, and in view of the above, it seems natural to explain these high-energy lanterns by investigating an MSP origin. An MSP population is expected to radiate several pulsed spectral components in the radio through gamma-ray wavebands, in addition to being sources of relativistic particles. The latter may interact with background photons in the clusters to yield TeV excesses, while they may also radiate synchrotron photons as they traverse the cluster B-field. We will present our modelling results for the 47 Tucanae and Terzan 5 clusters, focusing on the system
constraints that may be derived in the context of this model by comparing our model to multiwavelength data.

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