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Exploring the phenomenon of split main sequence in young star clusters via binary stars

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It is well-established that young stellar clusters in Magellanic Clouds (MCs) host stellar populations that are not simple. Features such as the split main sequence (MS) and the extended main sequence turn-off (eMSTO) are characteristics easily visible in all clusters younger than 2 Gyrs. Initially, these features were explained with prolonged or multiple star formation episodes, suggesting that they could be youthful counterparts of GCs.
The most supported interpretation is that all stars have the same ages but different rotation rates. Fast rotators are more prevalent on the red side (rMS), and slow rotators exhibit bluer colors (bMS). If rotation alone explains the eMSTO, this feature and the multiple populations in GCs are different phenomena.
Is it possible to form two stellar populations with different rotational velocities? A solution expects non-rotating MS stars to be initially rapidly rotators and later to be slowed down. This braking scenario could explain the extended eMSTO and the split MS phenomena without invoking an age difference.
According to this concept, interactions in binary star systems may be responsible for stellar braking, leading to a predominance of binaries among the blue MS.
I would present my investigation concerning the braking scenario based on tidal interactions, which play a fundamental role during the formation and evolution of cluster stars.
For the first time, I determine the frequency of binary stars among both blue and red MS stars in NGC1818, NGC1850, and NGC2164 using high-precision photometry data from the Hubble Space Telescope.
To achieve this, I employ a new method that compares multi-band photometry of binary systems with simulated diagrams of binary stars. This method allows me to infer information about the dynamical history of binary systems in the target clusters, and my significant finding reveals insight into the formation of MS stars in young star clusters.

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