Title:	A multi-wavelength study of intermediate-age open clusters
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Abstract:	Star clusters are ideal platforms for the study of evolution of X-ray activity as a function of stellar age and binarity, and thus categorising them in different classes. We present a comprehensive multiwavelength study of an open star clus- ter, NGC2527, by using data from three space observatories: X-rays and UV from XMM-Newton, UV from Swift UVOT and visible from Gaia. Cluster member- ship of stars and their photometry are taken from Gaia and cross-matched with XMM and UVOT detections. We estimate the age of NGC2527 as □630 Myr, reddening as E(B−V)=0.13 mag, and a distance of 642±30 pc using PARSEC isochrones. We detect 5 sub-subgiants and 5 bandgap stars, which defy single star evolution. We estimate the temperature, mass, radius, and luminosity of 53 single stars and 10 potential binary stars using a python code which fits single and composite Kurucz spectra to broad-band Spectral Energy Distribution. Among the 12 coronally active X-ray emitting stars, we find 5 are potential RS CVn type binaries, 2 are potential FK Comae type of red giant branch (RGB) stars, and 5 are main sequence (MS) stars with high coronal activity. Members with strong UV emission comprise of 1 RGB star, and several MS stars with UV excess sug- gestive of chromospheric activity. Based on comparison with other clusters, we tentatively suggest that X-ray luminosity of both RS CVn and contact binaries increases with age suggesting more active binaries are present in older clusters as compared to younger clusters. This study suggests possible presence of W UMa and FK Comae type stars in younger (age'630 Myr) clusters. To extend this work further, we proposed observations with the AstroSat UVIT and XMM-Newton of two open clusters: NGC 2506 and NGC 6940 respectively, both of which were accepted. NGC 2506 has already been observed and we present a preliminary analysis. . A detailed study of these clusters will allow us to connect and bridge gap in between various stages of binary stellar evolution. It will also provide information on the fundamental mechanism of formation and emission from various peculiar binaries such as blue stragglers, red stragglers, sub-subgiants, MS + extremely low mass WD binaries, etc. We give a summary of the objectives and expected results from the proposed observations.
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