# Observational Hertzprung-Russell Diagrams

A remarkable distribution of stars becomes apparent in Hertzsprung–Russell diagrams when the spectral type is plotted against the absolute magnitude, which is given by the distances of the stars. It is possible, however, to plot the color index of stars instead of the spectral class. [1]

A color-magnitude diagram resulting from this process is essentially the same as the HRD, except that it is based on photometric data. The diagram described here is typically referred to as an observational Hertzsprung-Russell diagram or a color-magnitude diagram (CMD), which is frequently used by observers. Hence, there exists a difference between Figure 1 of the paper which is just the observational form, and Figure 5 which also contains the approximate luminosity and temperature of these stars.

As illustrated in this figure, the absolute Gaia magnitude in the G band is plotted against the difference of BP and RP fluxes (blue and red Photometry). It should be noted that the color bar indicates the density of stars in a particular area.

The thin band in this generated figure contains most of the stars, which is called the main sequence. Also, at the left bottom of the figure, white dwarfs are visible. Moreover, from the top right corner of the main sequence, we reach the domain of red giants.

[1] B. Carroll, D. Ostlie, An introduction to modern astrophysics, Pearson, 2E, 2014