Synthetic photometry and the white dwarf luminosity function in Gaia DR3

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The White Dwarf Luminosity Function (WDLF) is a fundamental tool for analysing the properties of the local WD population, defined as the number of white dwarfs per cubic parsec as a function of unit luminosity. The WDLF of nearby stars can provide information on the age and evolution of the Galaxy and is a direct constraint on the death rate of local low-mass stars. The WDLF has previously been calculated from samples at a maximum distance of 25 pc (Holberg et al., 2016), 40 pc (Limoges et al., 2015), and most recently 100 pc (Gaia Collaboration; Smart et al., 2021). Each increase in distance has resulted in an increased sample size, which has improved the accuracy and resolution of observed WDLFs. We present early efforts using Gaia eDR3 data to extend the maximum distance limit of the local WDLF beyond 100 pc with the aim of generating a further improved WDLF. We discuss the implications of Gaia DR3 data for our work, which will have released at the time of EUROWD 2022. In addition, we will discuss our aims for future work utilising synthetic photometry of white dwarfs made available in Gaia DR3.