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Dust production in the Solar Neighborhood

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Asymptotic Giant Branch (AGB) stars dominate the total dust injection into the interstellar medium (ISM) of galaxies. Studies providing total dust injection rates in the Milky Way (Jura & Kleinmann 1989) and nearby galaxies (Riebel et al. 2012; Srinivasan et al, 2016) show the importance of accurately estimating this contribution. In this work we revisit the total dust mass-loss rate from AGB stars in the Solar neighborhood. Such an update is necessary, especially for an all-sky sample, as contrary to recent and old studies. One of the challenges for Galactic and dusty AGB sources is the distance determination, which we are primarily interested in, as they are the highest mass-loss rate objects. Using present-day all-sky infrared facilities (WISE, 2MASS, AKARI). We constructed spectral energy distributions for all the AGB candidates within within 2 kpc from the Sun, which we fit with models from the GRAMS grid (Sargent, Srinivasan & Meixner 2011; Srinivasan, Sargent & Meixner 2011) to estimate their dust-production rates. We find an integrated dust production rate of ~ 4 X 10^-5 Msun/year or an average of ~ 2 X 10^-8 Msun/year per object is obtained. We compare our results to those of the Magellanic Clouds and other Local Group galaxies, for which the distance determination problems do not exist. Separating the contribution into C- and O-rich AGB is also presented and is compared with estimates from the LMC and SMC as well. This work presents new insights into the contribution of low- and intermediate-mass stars to the ISM, and the discrepancy between the dust produced by AGB stars and the estimated reservoir in the ISM.

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