

# A POPULATION SYNTHESIS STUDY OF THE *Gaia* RESOLVED WHITE DWARF BINARY POPULATION

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The excellent quality of *Gaia* data has allows us to estimate a precise fraction of double-degenerate ( $1.18 \pm 0.10\%$ ) and white dwarf plus main-sequence stars ( $6.31 \pm 0.23\%$ ) among all white dwarfs through comoving pairs identification within 100 pc from the Sun. With the aid of a detailed population synthesis code we are able to reproduce synthetic white dwarf populations with nearly identical fractions as the observed ones. Our best-fit model is achieved within a  $1\sigma$  confidence level for an initial separation distribution  $f(a) \propto a^{-1}$ , an initial mass ratio distribution  $n(q) \propto q^{n_q}$ , with  $n_q = -1.13_{-0.10}^{+0.12}$ , and a binary fraction  $f_b = 0.32 \pm 0.02$ . The fraction of white dwarf mergers generated by this model is  $9 \sim 16\%$ , depending on the common-envelope treatment. As sub-products of our modelling we find that around  $1 \sim 3\%$  of the white dwarf population are unresolved double-degenerates and that only  $\sim 1\%$  of all white dwarfs contain a He-core. Finally, only a mild kick during white dwarf formation seems to be necessary for fitting the observed sky separation of double-degenerate systems.