

ON THE FORMATION OF MAIN SEQUENCE-MASSIVE WD BINARIES

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Although some 20 – 30% of all white dwarfs are found paired with M-dwarfs, there are no known high field magnetic white dwarfs with a detached M-dwarf companion. Such pairings also seem to be uncommon in the general class of massive white dwarfs in detached binaries, regardless of whether they are strongly magnetic or not. Taking note of the fact that high field magnetic white dwarfs tend to have high-mass progenitors, we propose that the above result may be a direct consequence of the manner in which stars with primary masses M_1 are paired with secondary masses $M_2 \leq M_1$ on the main sequence. Our calculations suggest that primaries with masses greater than about 3 solar masses that evolve into the more massive white dwarfs tend to pair with M-dwarf secondaries in a region of the mass ratio distribution $f(q)$ ($q = \frac{M_2}{M_1} \leq 1$) that decreases with decrease in q . On the other hand, the less massive primaries that evolve into the bulk of observed white dwarfs have companions in a region of the $f(q)$ distribution that is consistent with these being distributed according to an Initial Mass Function peaking near $M = 0.2 - 0.3$, such as that derived by Chabrier (2005).