The origin of low-mass white dwarfs

A.Rebassa-Mansergas[1], A.Nebot Gomez-Moran[2], M.R.Schreiber[1], B.T.Gänsicke[3]

[1] *Departamento de Física y Astronomía, Universidad de Valparaíso, Avenida Gran Bretana 1111, Valparaíso, Chile*
[2] *Astrophysikalisches Inst. Potsdam, An der Sternwarte 16, 14482, Potsdam, Germany*
[3] *Department of Physics, University of Warwick, Coventry CV4 7AL, UK*

Low-mass white dwarfs ($M_{\rm WD} < 0.5{\rm M}_{\odot}$) are thought to have form in binaries as a consequence of strong mass transfer interactions. However, recent radial velocity and infrared studies of apparently single low-mass white dwarfs reveal that a significant fraction of these do not have close companions. In this work we present the first white dwarf mass distributions directly obtained from observations of a large sample of post-common envelope binaries (PCEBs) and wide white dwarf-main sequence binaries (WDMS). The two distributions differ significantly. Whilst the PCEB sample is dominated by systems containing low-mass white dwarfs, the white dwarf mass distribution of the wide WDMS binaries is similar to that of single white dwarfs. Taking into account observational biases we find that the vast majority of low-mass white dwarfs must have formed in close binaries.