

FORMATION OF DOUBLE DEGENERATES WITH EXTREMELY LOW-MASS
WHITE DWARF COMPANIONS

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Extremely low-mass white dwarfs (ELM WDs) are helium WDs with a mass less than $\sim 0.3M_{\odot}$. Most ELM WDs are found in double degenerates (DDs) in the ELM Survey. These systems are supposed to be significant gravitational-wave (GW) sources in the mHz frequency. According to the observational characteristics of ELM WD binaries, there are two different formation scenarios of such objects, i.e. stable Roche lobe overflow channel (RL channel) and common envelope ejection channel (CE channel). In this talk, I will discuss the formation of ELM WDs in DDs by a combination of detailed binary evolution calculation and binary population synthesis. Further, due to the thick envelope of ELM WDs compared with massive WDs (e.g., CO WDs), they are much easier to be found through the combination of electromagnetic (EM) and GW observations. I will discuss the GW radiation of DDs with ELM WD companions. Finally, I will introduce the new criterion of mass transfer stability from the adiabatic mass loss model, and discuss its influence on the double white dwarf populations.