Angular momentum transport within evolved low-mass stars

Matteo Cantiello*[1]

[1]Kavli Institute for Theoretical Physics (KITP) – Kouhn Hall, UCSB, Santa Barbara, California, United States

Abstract

Stars are born rotating. From the zero age main sequence to the final compact remnant, calculations including mechanisms for the transport of angular momentum can make predictions about the evolution of the internal angular momentum distribution. Thanks to asteroseismology and in particular to the KEPLER satellite it is now possible to test these predictions, since the splitting of mixed modes allows to measure the core rotation in red giants and clump stars. I will show MESA calculations of rotating low-mass stars in the mass range 1.5-3.0M from their zero age main sequence to the cooling white dwarf stage. These models include transport of angular momentum due to rotational mixing and magnetic fields in radiative zones. Using the predicted splitting obtained from the MESA models coupled with the ADIPLS code, I will show that these models fail to predict the asteroseismic observations of stars on the RGB and during core He burning, implying that some extra angular momentum process must be operating on the early RGB of low mass stars. I will briefly discuss the most promising candidate processes.

*Speaker