# Gravito-inertial waves in stars: Excitation and impact on the transport of angular momentum solar-type stars.

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A key open question in the field of modern stellar physics is the distribution and evolution of angular momentum throughout a star's lifetime (e.g. Meibom et al. 2009, 2011, F. Gallet & J. Bouvier 2013). Observational constraints from helio- and asteroseismology (e.g. García et al. 2007) reveal discrepancies that cannot be fully explained by classical processes such as meridional circulation and shear-induced turbulence, underscoring the need for additional transport mechanisms (Charbonnel et al. 2013). Internal gravity waves (IGWs), together with magnetic fields, have emerged as promising candidates. In particular, gravito-inertial waves (GIWs) are thought to play a pivotal role in regulating angular momentum and chemical transport in stellar interiors (e.g. Schatzman 1993; Zahn et al.1997, Charbonnel & Talon 2005, Rogers & McElwaine 2017, Mathis et al. 2017). However, several aspects of their excitation, dissipation, and the influence of rotation remain poorly understood.

In this work, we develop a new theoretical framework for GIWs, that consistently accounts for rotational effects in both their excitation and damping. We implement a rotation-dependent interface excitation prescription, together with a Coriolis-modified damping formalism that includes the impact of rotation on wave propagation. This framework is incorporated into the stellar evolution code STAREVOL, allowing us to compute evolutionary models of low-mass and solar-type stars to quantify both the excitation and dissipation of GIWs.

These results provide new insights into the role of GIWs in shaping the internal rotation profiles and chemical mixing. They pave the way for direct comparisons with spectroscopic and asteroseismic observations, and for improved predictions in the context of upcoming missions such as PLATO, ultimately advancing our understanding of internal stellar dynamics and evolution.