# PyA2Z: Ensemble Precise Asteroseismology Across the Sky of 20,000 TESS Stars with Gaia Spectra

B. Liagre[1], R. A. García[2], S. Mathur[3], D. Godoy-Rivera[3]

1: Université Paris Cité, Université Paris-Saclay, CEA, CNRS, AIM, 91191, Gif-sur-Yvette, France
2: Université Paris-Saclay, Université Paris Cité, CEA, CNRS, AIM, 91191, Gif-sur-Yvette, France
3: Instituto de Astrofísica de Canarias (IAC), E-38205 La Laguna, Tenerife, Spain

We perform a homogeneous seismic analysis of over 20,000 solar-like oscillators with available Gaia spectroscopy and observed by TESS. Using the PyA2Z pipeline, we extract global seismic parameters, including the large frequency separation ($\Delta\nu$), the frequency of maximum oscillation power ($\nu_{\mathrm{max}}$) as well as the phase parameter ($\varepsilon$) and the small frequency separation ($\delta\nu_{02}$).
To characterize this population, we implement an automated classification pipeline based on a modified version of the Scaled Width of dipole mode distributions to distinguish between red-giant branch (RGB) and core-helium-burning (HeB) stars. Using corrected scaling relations, we derive stellar masses and radii. We systematically compare these seismic radii with independent estimates from Gaia parallaxes to assess the validity of scaling relations across different evolutionary phases.
This work establishes a reference catalogue for future galactoarcheology and spectroscopic studies. Our results provide a fundamental dataset beyond the TESS continuous viewing zone for calibrating large-scale spectroscopic surveys such as 4MOST. It also serves as a critical stepping stone for the upcoming PLATO/HAYDN/Roman missions, ensuring the robustness of stellar characterization for the next generation of space-based photometry.