Seismic Quantities

Information that we can obtain

$$\nu_{max} \propto g T_{eff}^{-1/2}$$

$$\Delta\nu \propto \rho^{-1/2}$$

- In this study they look for Solar-like oscillations in a star's power spectrum (≤ 20 μHz)
- They characterized by two globalseismic quantities:

ν_{max} **the frequency of the maximum acoustic power**,

and

$\Delta\nu$ **the large frequency spacing between adjacent overtone oscillation modes.**

$$\left(\frac{M}{M_\odot}\right) \simeq \left(\frac{\nu_{\rm max}}{\nu_{\rm max,\odot}}\right)^3 \left(\frac{\Delta\nu}{\Delta\nu_\odot}\right)^{-4} \left(\frac{T_{\rm eff}}{T_{\rm eff,\odot}}\right)^{3/2} \quad (1)$$

$$\left(\frac{M}{M_\odot}\right) \simeq \left(\frac{\Delta\nu}{\Delta\nu_\odot}\right)^2 \left(\frac{L}{L_\odot}\right)^{3/2} \left(\frac{T_{\rm eff}}{T_{\rm eff,\odot}}\right)^{-6} \quad (2)$$

$$\left(\frac{M}{M_\odot}\right) \simeq \left(\frac{\nu_{\rm max}}{\nu_{\rm max,\odot}}\right) \left(\frac{L}{L_\odot}\right) \left(\frac{T_{\rm eff}}{T_{\rm eff,\odot}}\right)^{-7/2} \quad (3)$$

$$\left(\frac{M}{M_\odot}\right) \simeq \left(\frac{\nu_{\rm max}}{\nu_{\rm max,\odot}}\right)^{12/5} \left(\frac{\Delta\nu}{\Delta\nu_\odot}\right)^{-14/5} \left(\frac{L}{L_\odot}\right)^{3/10} \quad (4)$$

$$g/g_\odot \simeq \left(\frac{\nu_{\rm max}}{\nu_{\rm max,\odot}}\right) \left(\frac{T_{\rm eff}}{T_{\rm eff,\odot}}\right)^{-1/2}$$

$$\left(\frac{R}{R_\odot}\right) \simeq \left(\frac{\nu_{\rm max}}{\nu_{\rm max,\odot}}\right) \left(\frac{\Delta\nu}{\Delta\nu_\odot}\right)^{-2} \left(\frac{T_{\rm eff}}{T_{\rm eff,\odot}}\right)^{1/2}$$

Howell, M., 2023. doi:10.48550/arXiv.2307.07158.

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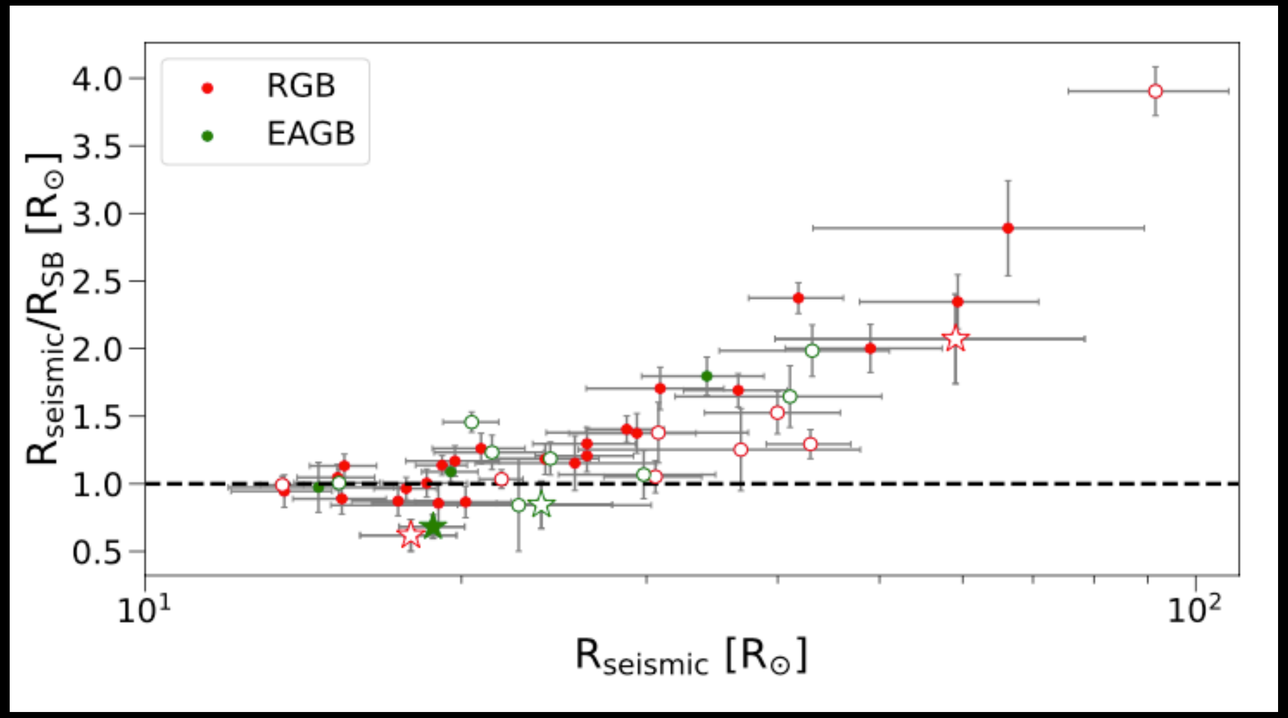

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$$R_{SB} = \left(\frac{L}{4\pi\sigma T^4}\right)^{1/2}$$

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