

A CLOSURE MODEL WITH PLUMES STOCHASTIC EXCITATION OF STELLAR P MODES

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Abstract. Oscillations of stellar p modes excited by turbulent convection are investigated. Our modelling includes the entropy contribution. We reproduce rather well the solar seismic constraints. However, discrepancies still remain that call for further theoretical improvements.

1 Introduction

In the uppermost part of the solar convective zone, turbulent entropy fluctuations and motions of eddies drive acoustic oscillations (Laurel & Hardy 1994; Heisenberg et al. 1993).

2 Closure models for turbulent convective layers

The Quasi Normal Approximation permits the fourth-order turbulent vertical velocity correlations to be decomposed in terms of a product of second-order ones, that is (see Paper I):

$$\langle w'^4 \rangle_{\text{QNA}} = 3 \langle w'^2 \rangle^2, \quad (2.1)$$

where w' is the turbulent vertical velocity.

As seen in Fig. 1 and in Fig. 2, our calculations are found closer to the observations than those done by Laurel & Hardy (1994).

Thank you!

References

- Einstein, A., 1926, ApJ, 63, 196
Heisenberg, W., & West, C.N., Cox, T., 1993, Australian J. Phys., 537, 36 (Paper I)
Laurel, S., & Hardy, O. 1994, Active Galactic Nuclei, in The Evolution and Distribution of Galaxies, ed. W. Churchill, F. D. Roosevelt, & J.

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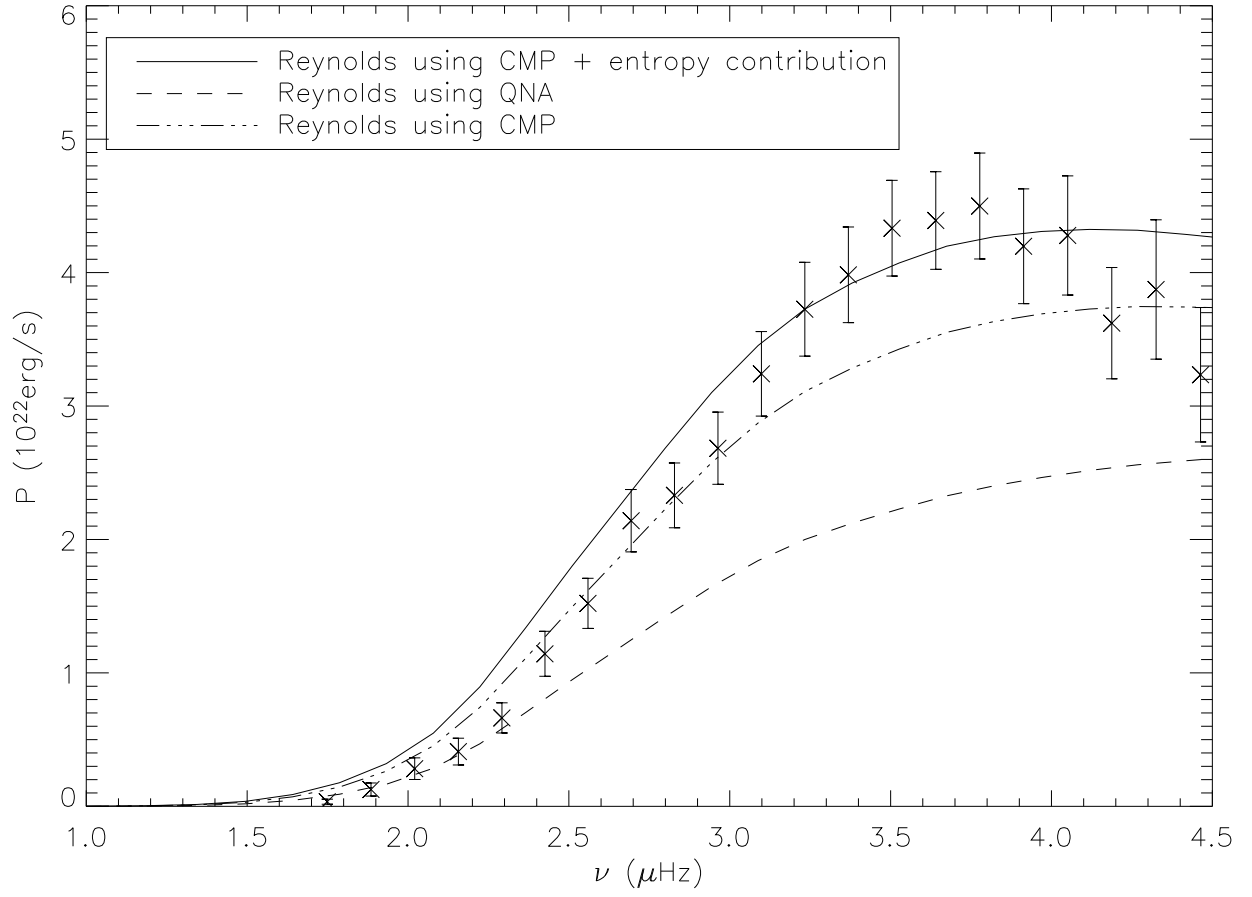


Fig. 1. Rate P at which acoustic energy is injected into the solar radial modes.

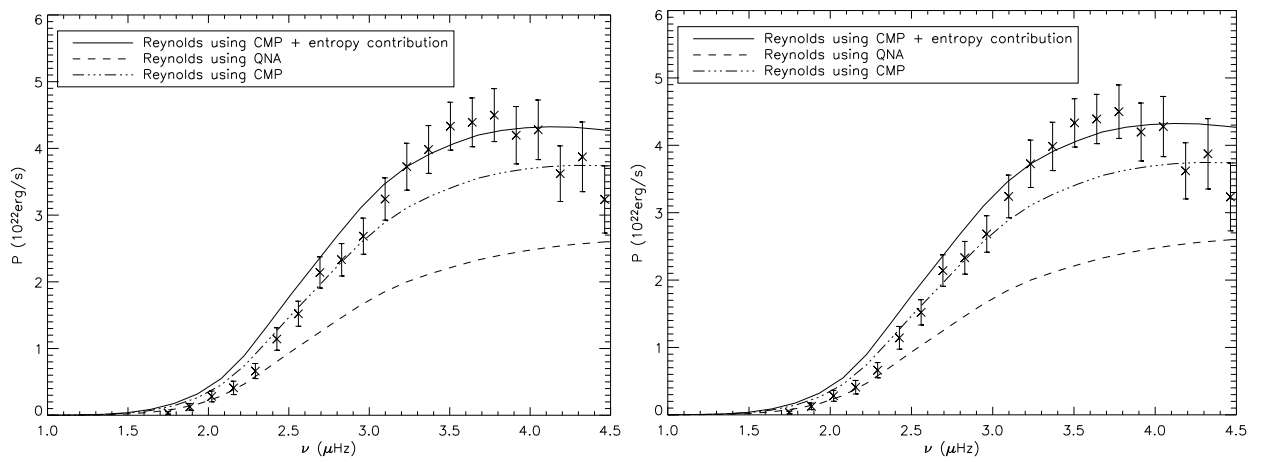


Fig. 2. **Left :** Rate P at which acoustic energy is injected into the solar radial modes. **Right:** Rate P at which acoustic energy is injected into the solar radial modes.