Characterization of echelle ridges in fast rotating δ Scuti stars: Eigenmodes and rotational splittings

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Abstract

Unexpected regularity of echelle ridges were published for fast rotating δ Scuti stars (Paparó et al, ApJ, 822, 100 and ApJS 224, 41). We present here a subset of stars where the dominant spacing proved to be the large separation according to the relation of Suárez et al (2014). In these stars the eigenmodes and the rotationally split frequencies are located on independent echelle ridges. Eigenmodes and the rotationally split ridges are determined, but only guesses are given for the horizontal quantum number.

General description of the figures

The triplets with similar rotational splittings (in units of Ω) are marked by the same colour. The value of the splittings are given. The single echelle ridges are marked in black. The shift of the different triplets are marked in black, also in units of Ω. A shift of the echelle ridges by half of the large separation are marked in magenta. In the asymptotic regime, identifications depend on the relative location of the ridges of different types. We assumed that such rules still continue to apply to some extent in the non-asymptotic regime. The rotation rates range from 29% to 31% of the break-up rotation rate, except for Star No. 1 which is at 25%. The frequencies of the highest amplitude modes are marked in order by small black numbers. X-axes: modulo Δν, y-axes: frequency in d⁻¹.

Conclusion

The high level of regularity suggests that the rotation frequency is highly connected to the large separation determined by the structure of the star. Although we can find the eigenmodes and the rotationally split ridges, the unique mode identification is questionable.

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