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# Asteroseismic measurement of surface-to-core rotation in a main sequence A star, KIC 11145123

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## Abstract

We have discovered rotationally split core g-mode triplets and surface p-mode triplets and quintuplets in a terminal age main sequence A star, KIC 11145123, that shows both delta Sct p-mode pulsations and gamma Dor g-mode pulsations. This gives the first robust determination of the rotation of the deep core and surface of a main sequence star, essentially model-independently. We find its rotation to be nearly uniform with a period near 100d, but we show with high confidence that the surface rotates slightly faster than the core. A strong angular momentum transfer mechanism must be operating to produce the nearly rigid rotation, and a mechanism other than viscosity must be operating to produce a more rapidly rotating surface than core. Our asteroseismic result, along with previous asteroseismic constraints on internal rotation in some B stars, and measurements of internal rotation in some subgiant, giant and white dwarf stars, has made angular momentum transport in stars throughout their lifetimes an observational science.

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