Long-Period Radial-Velocity Variations of Arcturus

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We have measured the relative radial velocity of Arcturus using the HF absorption cell technique on 43 occasions from 1981 through 1985. The range of our velocities is 500 m s^{-1}, which is much larger than our estimated internal errors (typically 10 m s^{-1}). This confirms the radial velocity variability of Arcturus that has been previously reported by our group and others based on shorter observational time spans.

Using a non-linear least squares technique, we have determined a number of multi-periodic models which give a good representation of our data as well as those of Smith, McMillan, and Merline. The small-amplitude short-period components of these models presumably result from non-radial oscillations of Arcturus. More observational data are required to sort out aliasing problems of these components. All least squares models consistently require the largest amplitude component to have a period of 650 days or longer regardless of which aliases are chosen to represent the short-period oscillations.

There are two general possibilities for explaining the long-term component. The component could be the result of motions of the Arcturus surface or could be the result of an orbital companion to Arcturus with m sin i in the range from 1 to 8 Jupiter masses.