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Title: The Kepler revolution: New views of our Sun and stars like it
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Session: Stellar Activity, Rotation, Ages, Metallicity
Abstract: Kepler has observed ~100,000 solar-type stars for years at high photometric precision. That unprecedented data extent and quality is bound to reveal things never seen before as well as new insights into inadequately understood phenomena, yet Kepler's importance for stellar astrophysics has gone well beyond what was hoped for. This is an exciting time for the study of the Sun and stars like it.

The effects of starspots on rotation are the most obvious feature of most Kepler light curves, and for many stars it is also possible to discern the effects of differential rotation as spots drift in latitude, and the growth and decay of spots from phase changes in the light curves. Our ability to study and understand rotation has improved significantly, yet remains compromised by stars with no apparent variations (incomplete samples), unknown binaries, and the difficulties of extracting longer periods for the older stars, the ones than can best test our models of angular momentum loss. There are also some hints that close-in planets may have tidal effects on their host stars.

Rotation and activity are intimately related, as are starspots and their coverage. Of greater interest, Kepler provides critical information that can illuminate stellar activity cycles. This offers the hope of real insight into the magnetic dynamo, perhaps enough to enable an effective theory of magnetic field generation. Adding to this mix are the G stars seen to flare energetically by Kepler and their potential significance for our own Sun.

To do all that, precise and accurate age are needed for stars, particularly older ones, and in that area Kepler has been especially fundamental. The ages are made possible by the detection of p-modes in short-cadence data, but other stellar parameters must be determined independently from high-quality spectra, particularly the composition, in order to create a good model fit. Within the context of those stellar models it is possible to determine ages to 10% and sometimes better, particularly for somewhat evolved stars. However, the oscillations are seldom detected in stars of the Sun's mass, especially for its age and younger, again adding a detection bias and leaving us with an incomplete view.

Recent advances in all these areas will be highlighted to illustrate the accomplishments of this extraordinary mission in these areas.