Talk at Splinter Meeting

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Stellar activity: key or nuisance?

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"Stellar activity" is a term that came originally from solar astrophysics, where astronomers refer to the quiet Sun and the active Sun depending on whether our star is in a state of sunspot minimum or maximum. More physically, we mean with activity all (mostly) non-thermal phenomena inside and outside of a star that are typically related to its magnetic field (rather than classical pulsation), e.g., the rise of flux tubes in a stellar convection zone and their appearance as spots and plages on the stellar surface, or magnetically/electrically induced particle acceleration and its braking effect on stellar rotation, or simply the interplay between a magnetic field and its surrounding plasma from the convection zone to the asterosphere. Detecting and characterizing extrasolar planets put stellar activity in yet another spotlight; the role of astrophysical noise.

In this talk, I will focus on the many aspects of stellar magnetic fields and surface inhomogeneities. I will concentrate on the available observations and some interpretations even though that fundamental progress will equally come from modern numerical magneto-hydrodynamics. I will emphasize how present magnetic activity will become once the new generation of large telescopes and high-resolution spectrographs are turned to stars with dynamic atmospheres.