

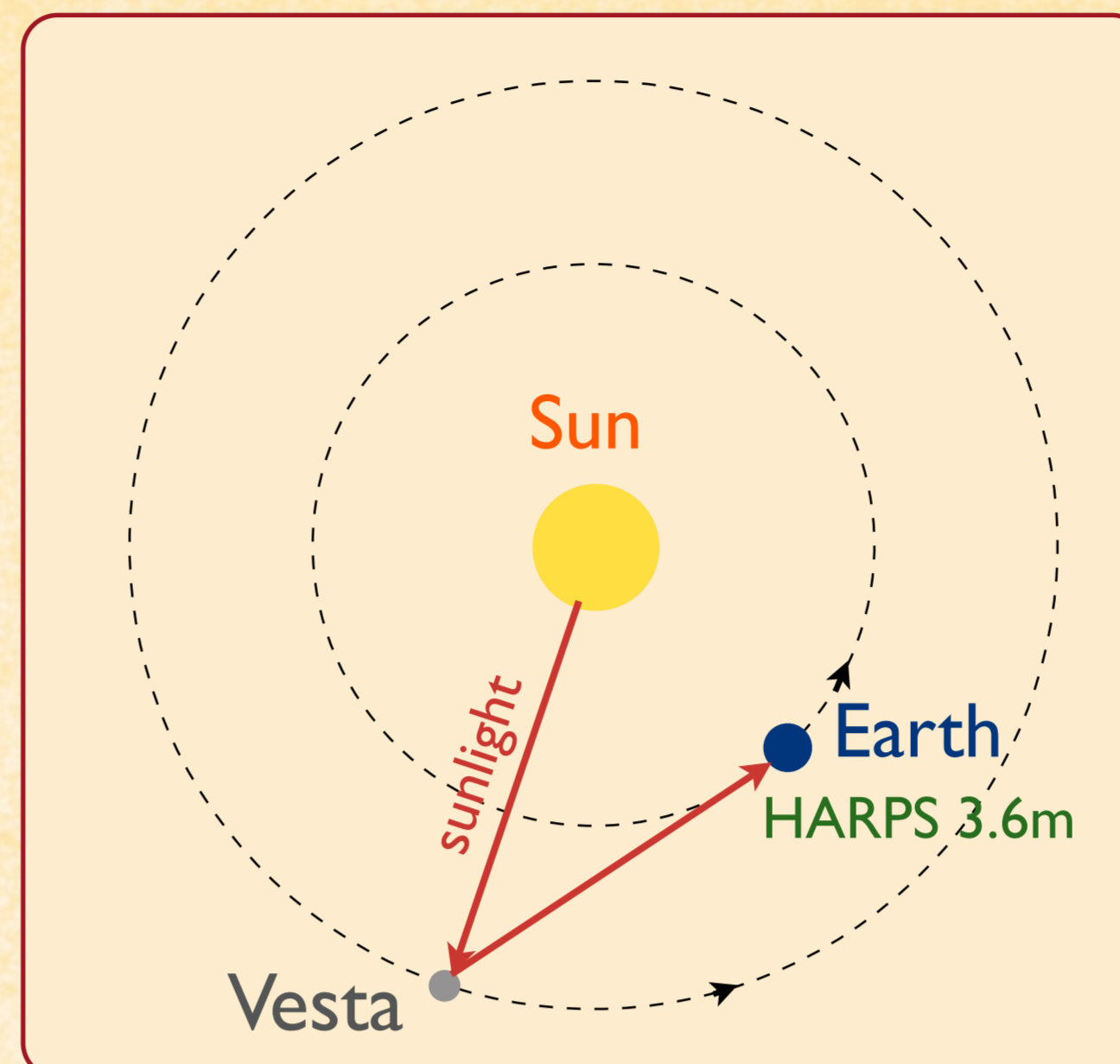
Understanding the Sun's activity to improve exoplanet radial-velocity detections

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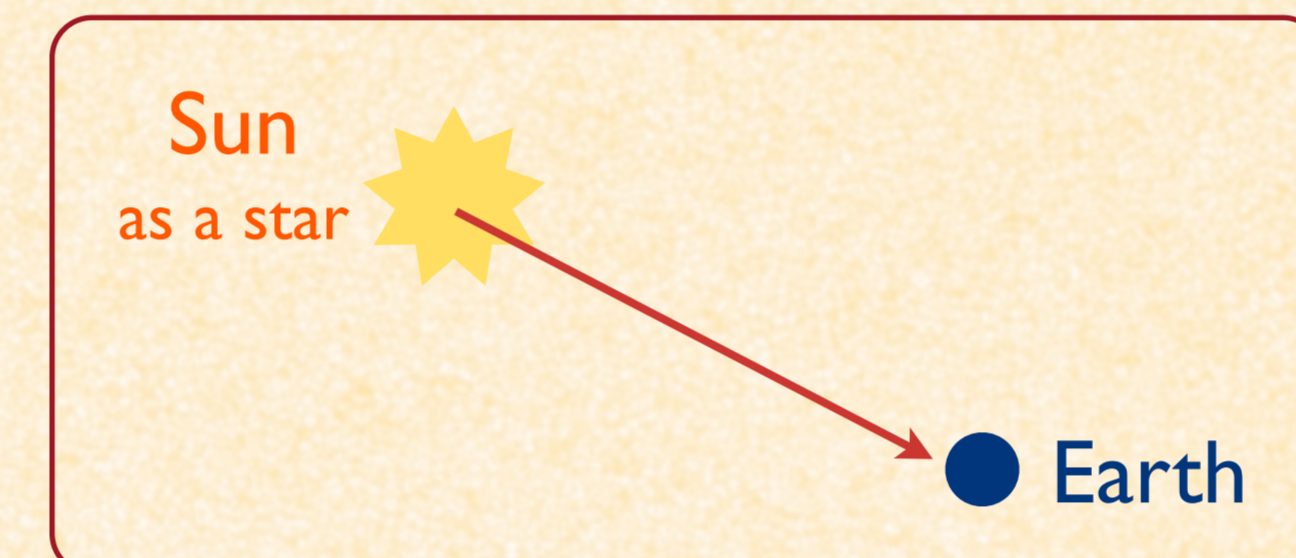


We are using high-resolution images of the Sun (continuum intensity, dopplergrams and magnetograms) taken by the HMI instrument onboard the Solar Dynamics Observatory, and HARPS radial-velocity (RV) observations of sunlight reflected off the bright asteroid Vesta to identify activity proxies that will enable us to disentangle planet signals from stellar activity.

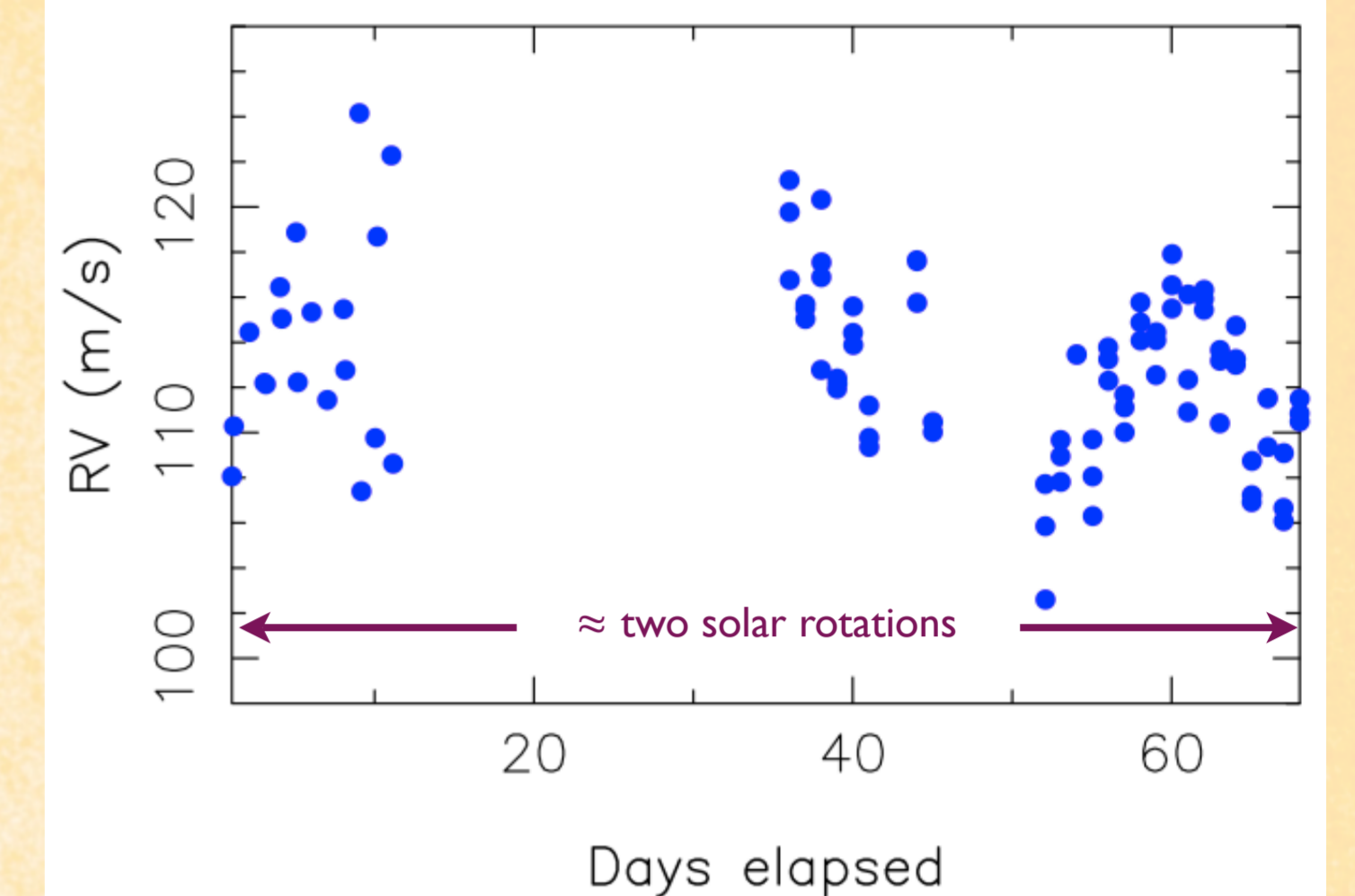
From HARPS RV observations of the asteroid Vesta to the Sun's radial-velocity variations



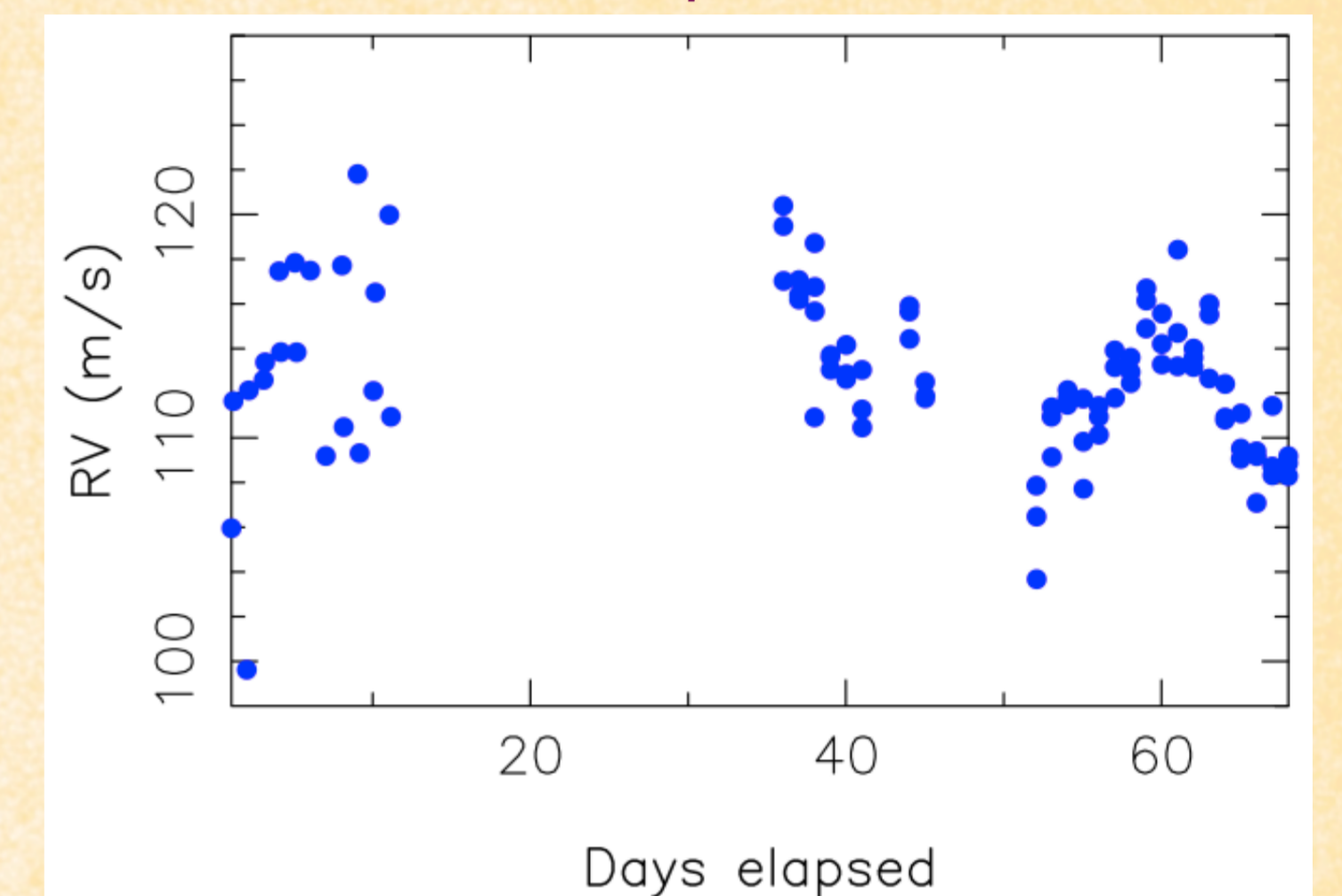
- Remove RV effects of bodies in solar system (planets, asteroids,...)
- Remove relativistic Doppler shifts
- Account for Vesta's axial rotation



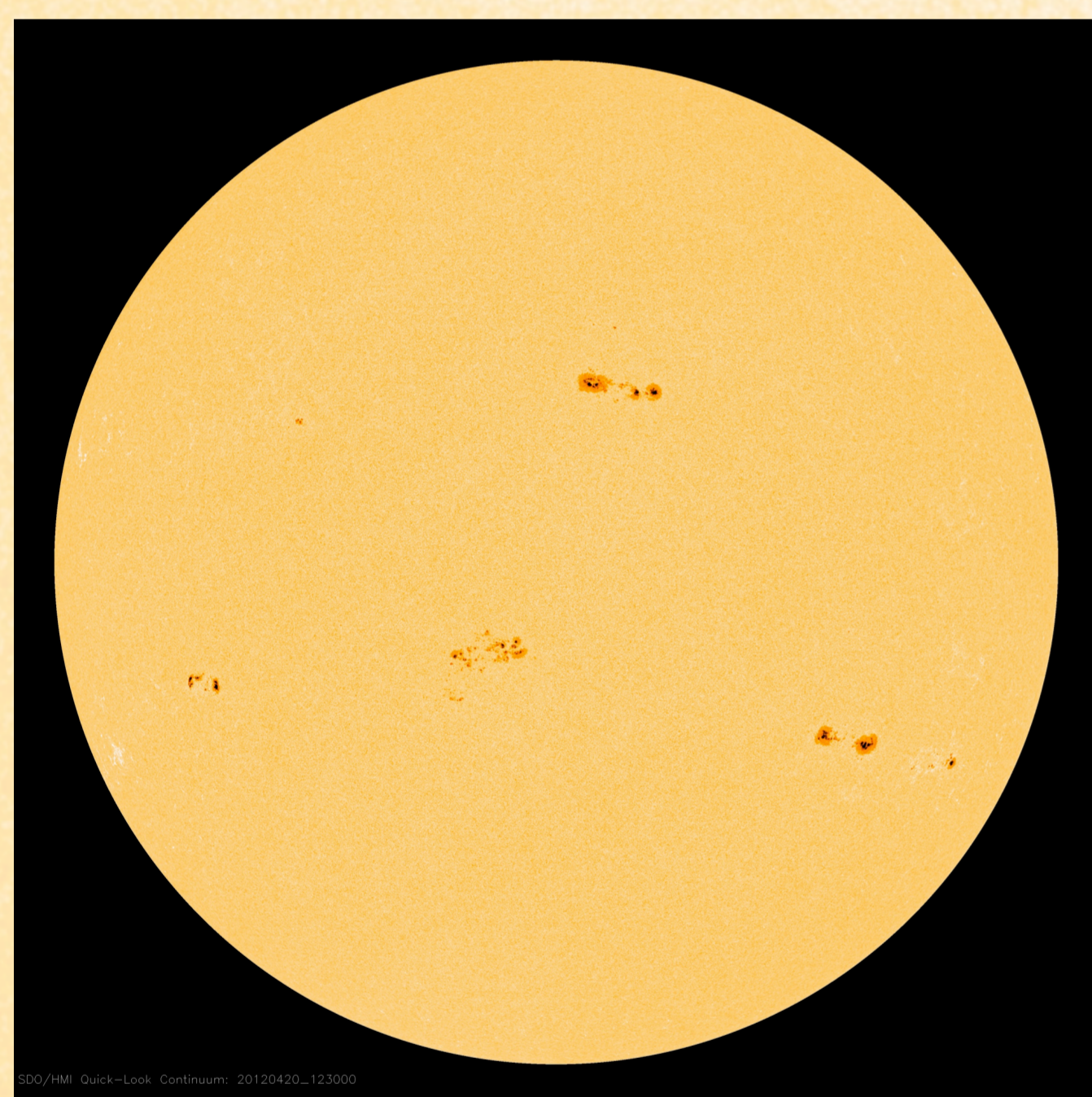
Solar RV variations *before* corrections



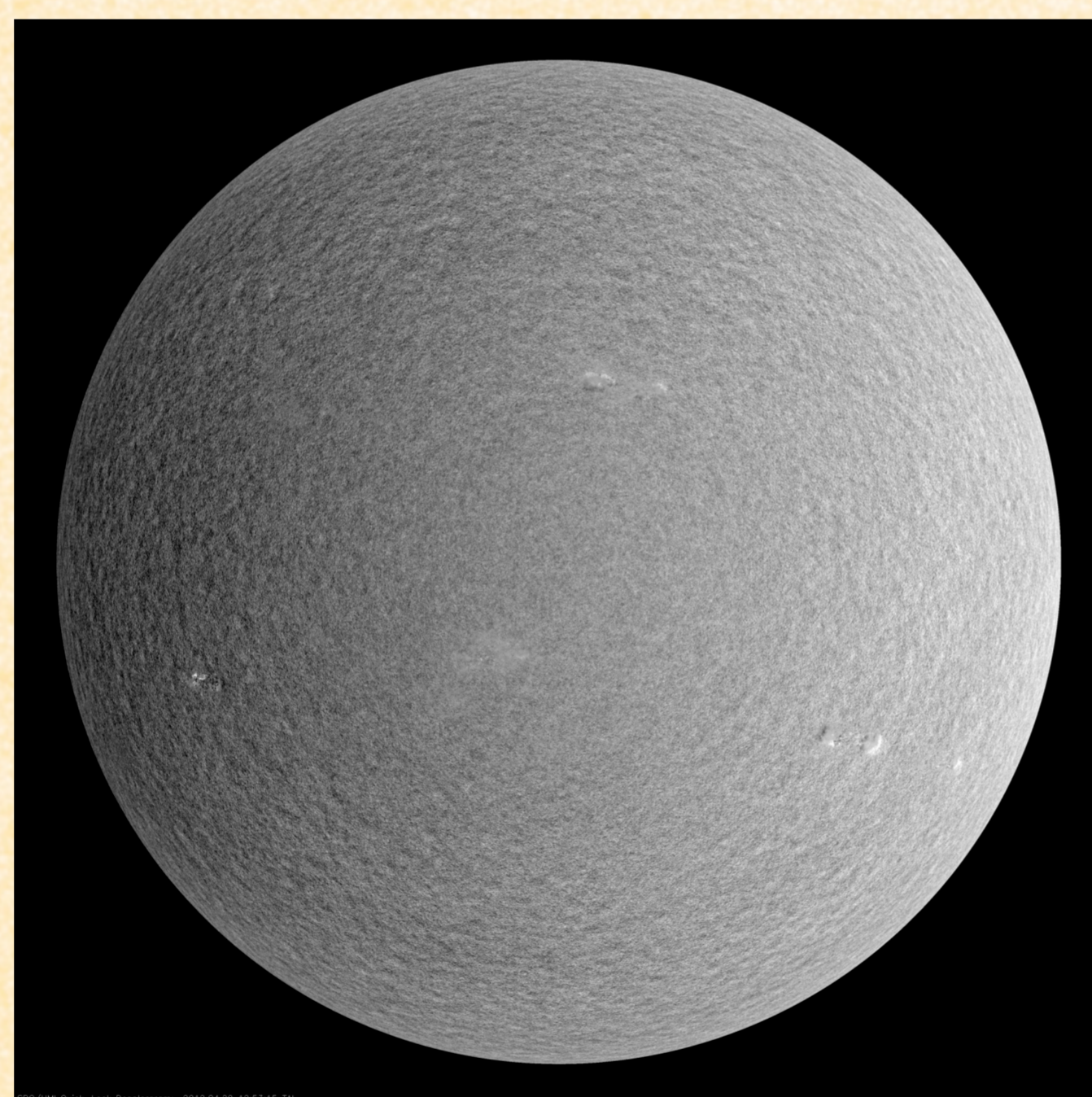
Solar RV variations *after* corrections



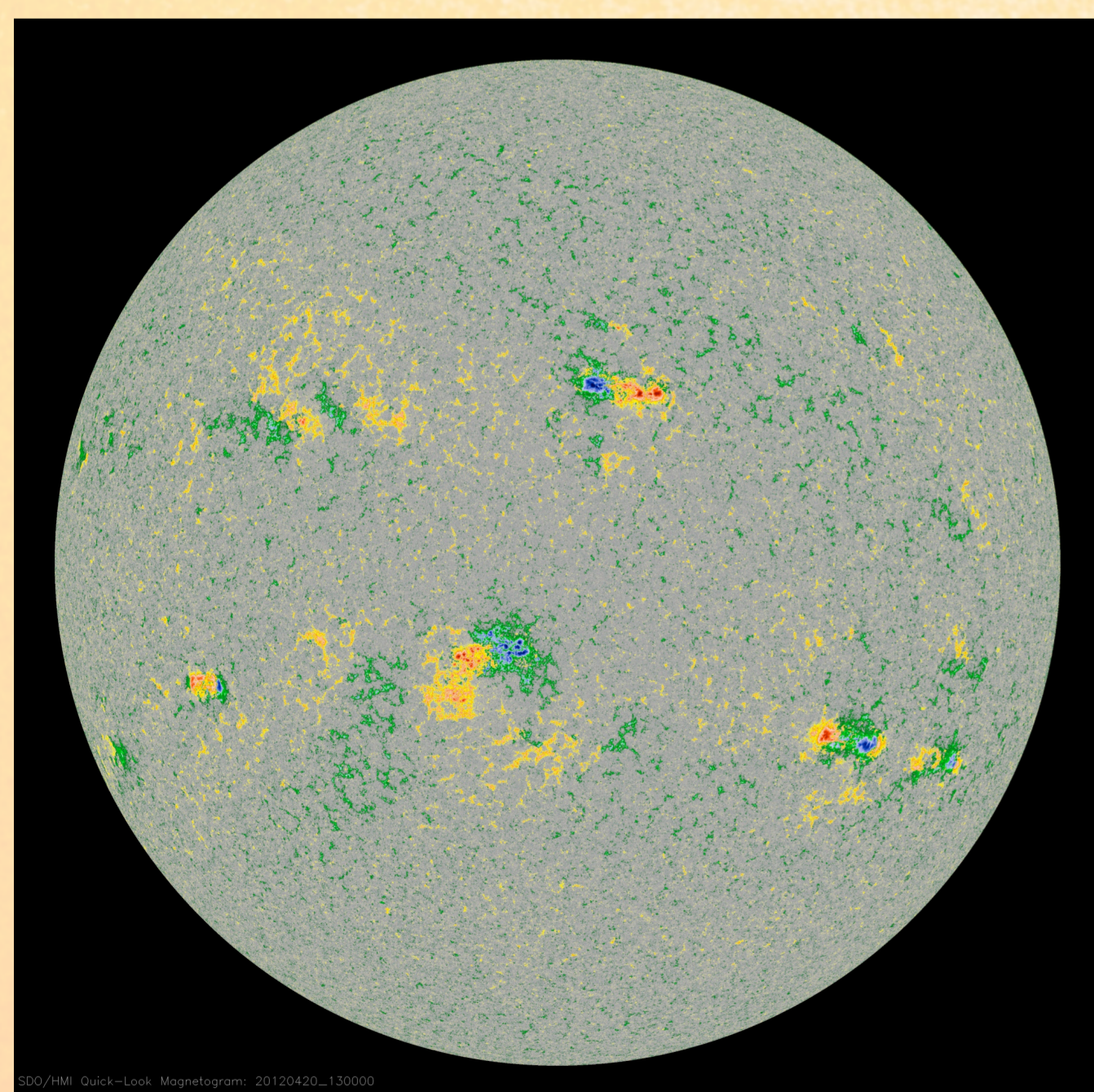
HMI/SDO high resolution images



Continuum image



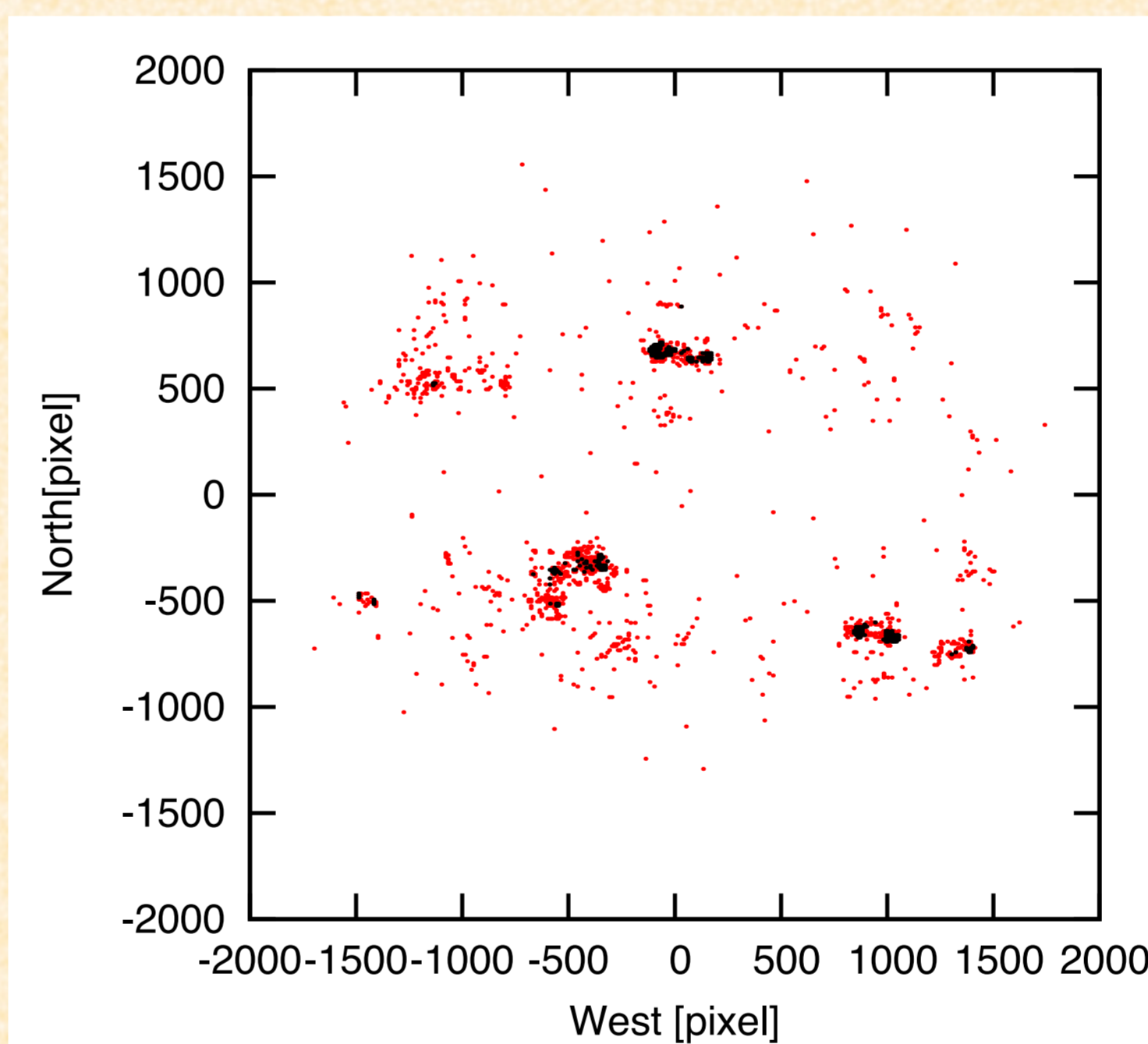
Dopplergram



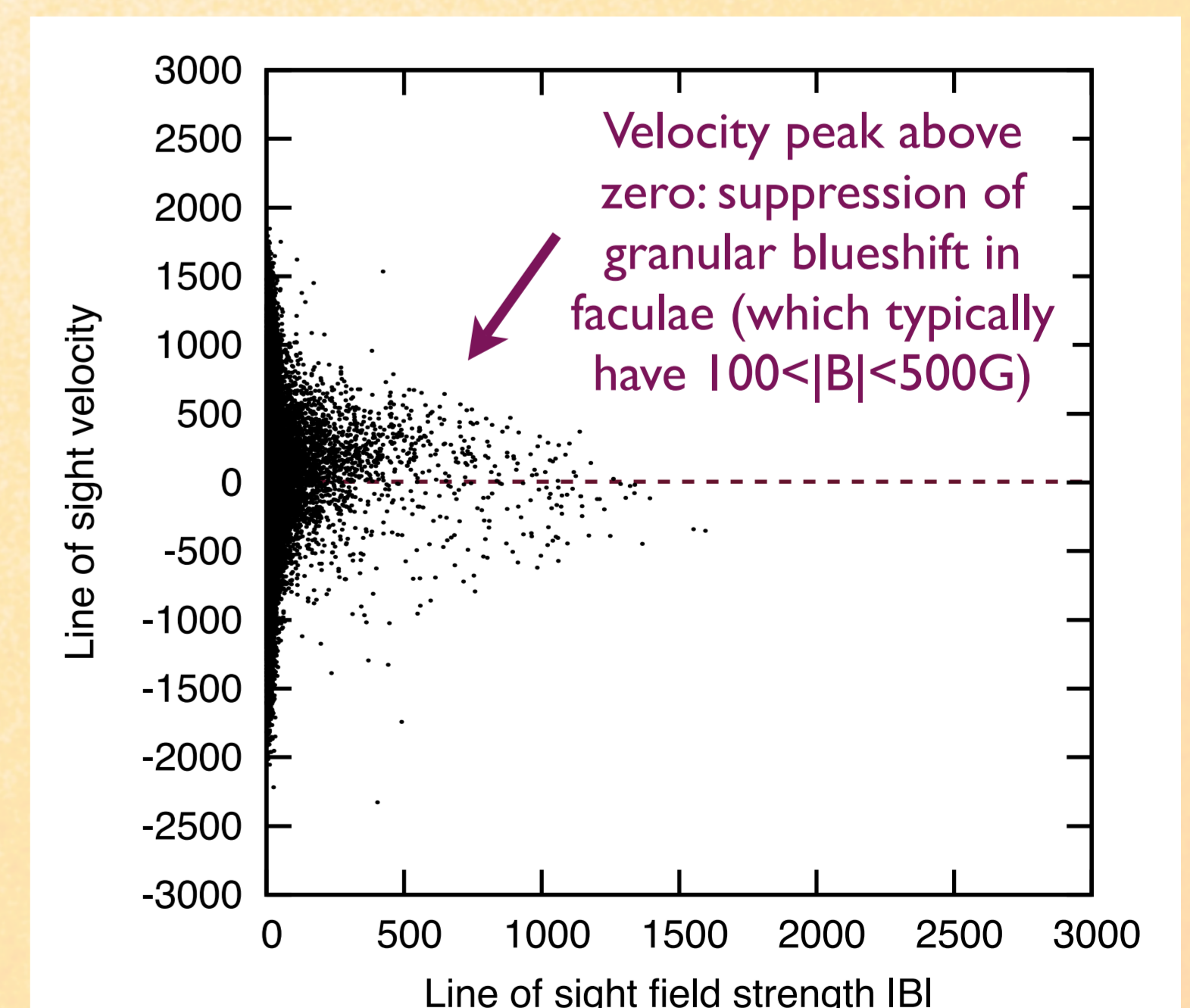
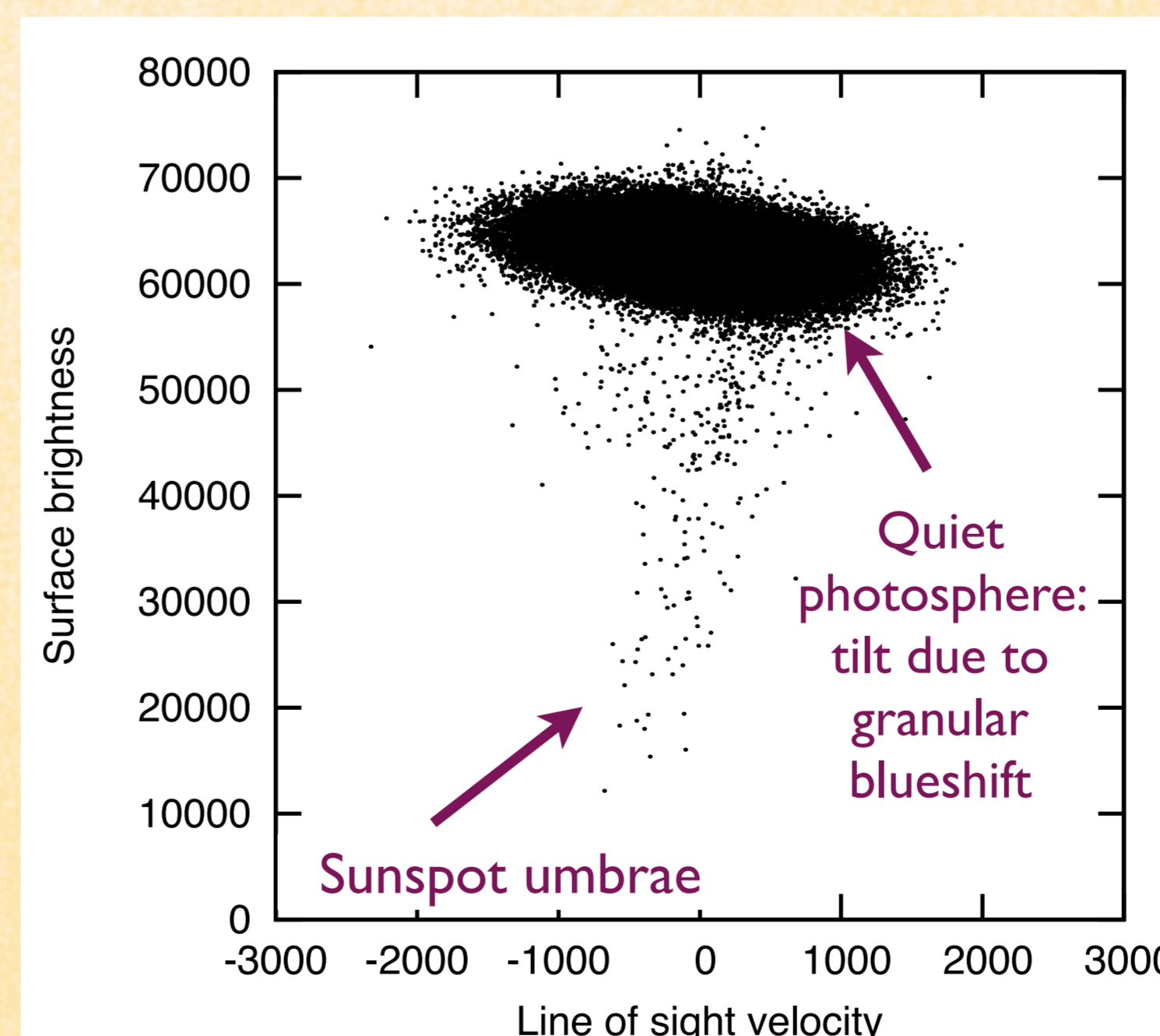
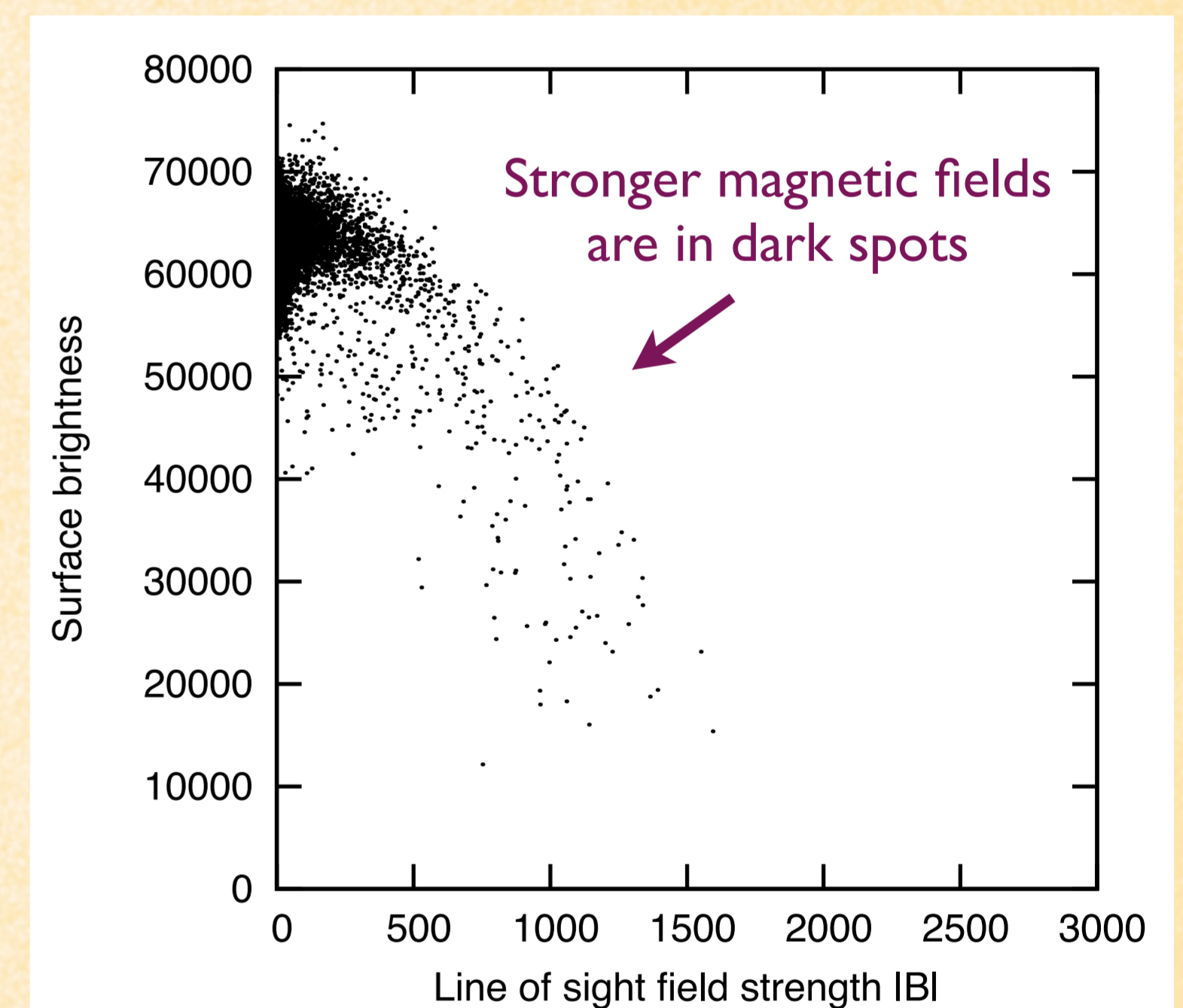
Magnetogram

We corrected the HMI images for the motion of the SDO spacecraft and removed the Sun's rotation.

Pixel-by-pixel analysis



Map of faculae (red) and sunspots (black) obtained by thresholding the magnetic and continuum images.



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