

M28a **Multi-height velocity measurements using SDO/HMI observation datasets**

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Multi-height Doppler velocity information in the solar atmosphere is useful for various purposes, e.g., studies of wave propagation in the atmosphere and multi-height helioseismology analyses. Therefore, it would be significant if we could extract multi-height velocity information from the vast amount of space-borne full-disc observation datasets.

The Helioseismic and Magnetic Imager (HMI) on board the Solar Dynamics Observatory (SDO) takes full-disc solar images at six wavelengths around the Fe I 6173 Å line. Standard HMI Dopplergrams are made from these filtergrams. The formation height of these Dopplergrams is estimated to be around 100 km above the surface. We use the HMI filtergrams to create several alternative Dopplergrams. For example, instead of using all six data points along the line, we use only one pair of data points: one from the red-side wing and another from the blue side. By taking the difference of the pair we get Dopplergrams with a formation height that is different from that of the standard HMI Dopplergrams. We see clear phase differences between these newly-created Dopplergrams and the standard Dopplergram, which indicates that they are formed at different heights in the atmosphere. To estimate the formation height of the Dopplergrams, we analyze synthetic datasets computed from realistic convection simulations.