



## Multiple EUV wave reflection from a coronal hole

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EUV waves are large-scale propagating disturbances in the solar corona initiated by coronal mass ejections. We investigate the multiple EUV wave reflections at a coronal hole boundary, as observed by SDO/AIA on 1 April 2017. The EUV wave originates from Active Region (AR) 12645 close to the disk center and propagates toward the south polar coronal hole with an average velocity of 430 km/s. The interaction of the EUV wave with the coronal hole, which represents a region of high Alfvén speed, is observed as a splitting into two wave components: one continues propagation inside the coronal hole with an increased velocity of 850 km/s (transmitted wave), while the other one moves back toward the AR, also with an increased velocity of 600 km/s (reflected wave). The reflected EUV wave is subsequently reflected again from the AR and propagates toward the coronal hole with an average velocity of 350 km/s, where it is reflected for the second time at the coronal hole boundary and propagates again toward the AR with a velocity of 300 km/s. These events are observed over an interval of 40 minutes. The high cadence SDO imagery allows us to study in detail the kinematics of the direct and multiple times reflected EUV wave. In addition, its multi-wavelength EUV imagery allows us to derive the plasma properties of the corona and the EUV wave pulse via Differential Emission Measure analysis. These results are used to compare the observed characteristics of the wave interaction with the coronal hole with simulations.