

CORONAL LOOP SEISMOLOGY USING MULTIPLE TRANSVERSE LOOP OSCILLATION HARMONICS

T. Van Doorselaere, V. M. Nakariakov and E. Verwichte

Department of Physics, University of Warwick, Coventry, CV4 7AL, UK

TRACE observations (23/11/1998 06:35:57-06:48:43UT) of an active region are studied. In this active region, coronal loop oscillations are observed after a violent disruption of the equilibrium. To investigate the oscillations, a loop segment is traced during the oscillation, and the resulting time series is analysed for periodicities.

In the considered loop segment, two periods are found: 435.6 ± 4.5 s and 242.7 ± 6.4 s, consistent with the periods of the fundamental and 2nd harmonic fast kink oscillation. The small uncertainties allow us to estimate the density scale height in the loop to be 109 Mm, which is double the hydrostatical value of 50 Mm.

Because a loop segment is traced, the amplitude dependence along the loop is found for each of these oscillations. The obtained spatial information is used as a seismological tool to give details about the geometry of the observed loop.