HELIOSEISMIC WAVES AND ECHOES IN MULTI-THREAD ARCADES OF CORONAL LOOPS

M. Ryutova

LLNL/IGPP, Livermore, CA 94550, USA

EUV coronal loops having well defined filamentary structure, often appear as an arcades of a thin magnetic threads resembling the wiring in a long curved solenoids. Such an arcades are typical to (but not limited by) the post-flare coronal structures. The arcades are usually a long living well organized structures. The elemental filaments however are in a highly dynamic state showing not only the oscillations, but harboring frequent microflares which often appear simultaneously in different places; i.e. several elemental filaments far removed from each other, may light up simultaneously. Besides, many individual filaments produce "homologous microflares" occurring repetitively in the same filaments. We present the observations of a spatio-temporal regularities in the coronal arcades using the data obtained with the Solar Optical Telescope (SOT) and the X-Ray Telescope (XRT) on Solar-B/Hinode. We find that the time intervals and spacing between seemingly sporadic brightenings follow the pattern typical to spatio-temporal plasma echoes - nonlinear wave phenomena occurring in magnetically structured media. We show that the observed regularities can be understood on basis of a spatio-temporal echoes of plasma waves resulted from nonlinear response of a system to the impulsive disturbences. Simple relations between the characteristic times and spacings allow one to study the propagation and evolution of a helioseismic waves from the solar surface to corona.