



The Doppler Spectro Imager (DSI-ECHOES) for EJSM/JGO: a dedicated instrument for Jovian internal structure and atmospheric study

F.X. Schmider, F. Rouesnel, T. Appourchaux, P. Gaulme, T. Guillot, J. Gay and the DSI team

As the seismology on Earth, the measurement of waves through seismic techniques is a powerful tool to investigate the internal structure of gaseous bodies like the giant planets. The success of helioseismology in the twenty past years demonstrates this potential. Global modes allowed recovering the density and dynamical profile down to the centre. Travelling waves recording also permitted local investigation at the surface of the Sun of the convection and magnetic activity.

On Jupiter, the same technique can be applied, and has been done so from the ground. A dedicated ground based network, SYMPA, obtained encouraging results, showing for the first time a signature in the power spectrum compatible with the expected behaviour of low degree modes.

However, as for the Sun with SoHO, a space project would dramatically improve the potential and the quality of such measurements. In particular, a strong gain can be obtained with a better spatial resolution, continuous observations and less sensitivity to guiding.

The instrument DSI-ECHOES has been proposed in answer to the DOI for instrument released by ESA for EJSM/JGO spacecraft. The concept is an imaging interferometric tachometer derived from the SYMPA project. The study demonstrated the capability of the proposed instrument to investigate the internal structure and dynamics and in particular to assess without ambiguity the presence of a dense core, giving strong constraints on Solar System formation scenario. The instrument has also a strong potential of investigation of the global circulation in the atmosphere, emphasizing the interface between the convective envelope and the upper troposphere.