Magnetic Experiments On-board LISAPathfinder

The differential acceleration measurement between two free-falling test masses on-board LISA Pathfinder is limited in the low frequency regime by force noise applied to the test masses. Several effects can contribute as force noise on the inertial masses and, amongst them, magnetically-induced forces are precisely one of these effects limiting the performance of the instrument in the millihertz band. The origin of this disturbance is the coupling of the residual magnetization and susceptibility of the test masses with the environmental magnetic field. In order to fully understand this term of the noise model, a set of coils and magnetometers are integrated as a part of the LISA Pathfinder diagnostics subsystem.

In this talk we will explain which are the different magnetic experiments we have carried on board LISA Pathfinder in order to extract the magnetic parameters that characterize LISAPathfinder's test masses. We will describe how, by analyzing the movement of the test masses during magnetic experiments, we can extract not only information about their magnetic properties,but also about the environment that surrounds them. We also provide the magnetic contribution to the LISA Pathfinder noise budget.