SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration (5)

Author: Dr. Agnes Levy
ONERA, Israel, agnes.levy@spaceil.com

Dr. Bruno Christophe
Office National d'Etudes et de Recherches Aérospatiales (ONERA), France, bruno.christophe@onera.fr
Dr. Bernard Foulon
Office National d'Etudes et de Recherches Aérospatiales (ONERA), France, bernard.foulon@onera.fr
Mr. Guillaume Pionnier
Office National d'Etudes et de Recherches Aérospatiales (ONERA), France, guillaume.pionnier@onera.fr

OSS: AN OUTER SOLAR SYSTEM MISSION TOWARDS NEPTUNE, TRITON AND KBO

Abstract

The present OSS proposal continues a long lived tradition of collaboration between the communities of fundamental physics and planetary sciences in a single mission with ambitious goals in both domains. OSS is a space mission to explore the Neptune system almost half a century after flyby of the Voyager 2 spacecraft. Several discoveries were made by Voyager 2, including the Great Dark Spot (which has now disappeared) and Triton's geysers. Voyager 2 revealed the dynamics of Neptune's atmosphere and found four rings and evidence of ring arcs above Neptune. Taking benefit of a greatly improved instrumentation, a striking advance in the study of the farthest planet of the Solar System will be possible. Furthermore, OSS will provide a unique opportunity to visit a selected Kuiper Belt Object subsequent to the passage of the Neptunian system. This will enable the comparison between Triton and a KBO within a single mission and therefore address the issue of the formation of the Solar System by examining the hypothesis that Triton is a KBO captured by Neptune. We propose OSS as an international collaboration giving the capability to ESA-NASA to launch a medium mission towards the farthest planet of the Solar system, and to a Kuiper Belt Object. During the cruise, precise tracking of the probe will be used to test the predictions of General Relativity with unprecedented accuracy. Up to now, experimental tests of gravitation have always shown good agreement with General Relativity. It is however important to continue testing gravitation with better accuracies and at larger scales as this theory shows inconsistencies with the Quantum Mechanics theory and the unified theories predict deviations from General Relativity. The OSS probe will embark instruments enabling to perform the best controlled experiment which has ever been done for testing gravitation in deep space.