
SCIENCE GOALS AND MISSION OBJECTIVES FOR THE FUTURE EXPLORATION OF ICE GIANTS SYSTEM: A HORIZON 2061 PERSPECTIVE

Michel Blanc*¹

¹irap – Centre national de la recherche scientifique - CNRS (France) – France

Abstract

Identifying a comprehensive set of "key questions" about planetary systems which we can address by means of the space exploration of the Solar System and of Giant Planets systems up to the Horizon of 2061 (a symbolic date corresponding to the return of comet P/Halley in the inner Solar System) is the objective of the on-going "Planetary Exploration, Horizon 2061" forward-look exercise. The first step of this exercise led to the identification of six "key questions" addressing our understanding of Planetary Systems: *1- what is their origin? 2- how do they form, and how do their formation scenarios lead to the observed diversity of their architectures? 3- Establish the full diversity of planet types and its causes; 4- How do Planetary Systems work, e.g. what coupling mechanisms operate between their components at the different scales? 5- What are the conditions and mechanisms leading to the emergence of potential habitats for life? 6- How to search for and detect life?* We will describe how this set of questions can be applied to the systems of Ice Giants of the solar systems, and what should be the most important measurement objectives should be aimed at on the different components of these still too poorly known systems, with the main objective of opening a discussion about the types of space missions that should be flown to these systems by 2061.

Keywords: planetary systems, ice giants, satellites, magnetospheres, internal structure, origins, habitability

*Speaker