

Key open questions linked to the origin, evolution, and structure of Uranus and Neptune. R. Helled, Institute for Computational Science, Center for Theoretical Astrophysics & Cosmology, University of Zurich Winterthurerstr. 190, CH-8057 Zurich, Switzerland

Uranus and Neptune, the farthest planets from the sun, form a distinct class of planets in our solar system. However, there are more open questions regarding these planets than answers. In this talk I will review the current-knowledge of Uranus and Neptune focusing on their formation history, evolution and internal structure. First, I will discuss the uncertainty in the planetary structure due to the degeneracy in interior models and the possibility of non-adiabatic and inhomogeneous interiors. I will next present new formation models of Uranus and Neptune via pebble accretion. I will show that both planets can form within ~ 3 Myr at their current locations, and have final compositions that are consistent with the heavy-element to H-He ratios predicted by structure models. I will also discuss the connection to giant impacts shortly after the formation of Uranus and Neptune and how such impacts can affect the final internal structure and satellite system. Finally, I will identify the topics that should be investigated further theoretically and the required measurements from future space missions.