

Icy satellite research by neutrino induced radios

Daigo Shoji^{1*}, Kei Kurita¹, Hiroyuki K.M. Tanaka²

Earthquake Research Institute, The University of Tokyo, Tokyo, Japan¹, Center for High Energy Geophysics Research, Earthquake Research Institute, The University of Tokyo, Tokyo, Japan²

In our solar system, some satellites covered with ice orbit around large planet such as Jupiter and Saturn. These satellites are called icy satellite. Icy satellites are important for planetary science and astrobiology because we can reference the environment of icy satellites in order to research the Earth and biology.

Regardless of many researches, icy satellites is not known well. In particularly, ice thickness is one of the problem. If the ice thickness is estimated accurately, we can know the magnitude of heating of the satellite and probability of the existence of lives.

In this presentation, we propose a new method to constrain the ice thickness by using radio waves induced by high-energy cosmic neutrinos. Considering the future mission for Europa and Enceladus, we performed simulations to confirm the efficiency of our method. Our method have possibility to constrain European and Enceladus' ice thickness even though ice is a few kilometers thick.