

Lunar Exploration (3)

Lunar Concepts (3)

Author: Prof.Dr. Jinsong PING

National Astronomical Observatories, Chinese Academy of Sciences, China, jsping@bao.ac.cn

JOINTLY PROMOTING A VERY LONG WAVELENGTH RADIO MISSION FOR CHANG'E-4 LUNAR FAR-SIDE LANDING MISSION

Abstract

Following the development of the Chinese lunar exploration program, astronomical facilities have been planned to set on the surface of the Moon so as to obtain new sciences from the Moon. The Chang'E 4 explorer (including a relay satellite, a lander and a rover, etc.) is a mission to the lunar far side, designed, assembled, and tested by CNSA. After longer than 10 years preparation of a joint radio astronomical team from National Astronomical Observatory of Chinese Academy of Science and from European radio astronomical society, very low frequency (of 100KHz 40MHz) radio astronomical detectors have been planned to firstly settle on the far side surface of the Moon, and on the relay communication satellite flying at L2 Earth-Moon Lagrange point, separately, in the Chang'E-4 lunar lander mission. The detectors will map the radio sky, detect the solar burst, investigate the lunar ionosphere, study the planetary radio burst, as well as work technically as a pathfinder mission for the future lunar surface low frequency radio observatory for cosmological researches. There are many limitations of nature and/or artificial are blocking the interferometric observation between the lander and the Earth ground, as well as between the lander and the relay satellite, where a joint Dutch and Chinese low frequency receiver (NCLE) installed. The joint NCLE mission team are trying the best to solve above limitations, so as to find a route to test the interferometric observatory between the lander and other possible low frequency unites. Among them, the most important ones are developing a time synchronization method among the lander, a relay satellite and the Earth ground site. With a possible 4-way tracking link, lander positioning and POD of relay satellite can be done at the same time. After that, with the relay communication link, a reasonable time synchronization can be carried out for space VLBI at the HF frequency.