

## EARTH OBSERVATION SYMPOSIUM (B1)

## Poster Session (P)

Author: Dr. Xidong Wang

National Space Science Center (NSSC), Chinese Academy of Sciences, China, 77071191@qq.com

Prof. Zhao Hua

China, hzhao@nssc.ac.cn

## HIGH SENSITIVITY CPT MAGNETOMETER BASED ON RUBIDIUM 87

**Abstract**

Considering drift of frequency and resonance line width in electromagnetically induced transparency, diffusion and decoherence of alkali metal atoms in the phase equilibrium system, the design theory of Coherent Population Trapping (CPT) magnetometer cell has been developed. The structure and air pressure parameters are calculated according to the theory. Many silica glass cells manufactured are filled respectively with nitrogen, helium, neon, argon, xenon, and appropriate amount of rubidium 87 atoms are confined in the cylindrical cell with 25mm in length and 25mm in diameter. The experiment results are consistent with the theory expectation. A high performance cell is chose to establish the fully optical CPT magnetometer. Temperature of magnetometer sensor is controlled by means of liquid cycle and the stability is 0.05°C, driving signal of VCSEL is produced by the mixture of high quality high frequency and low frequency source. In the magnetic shielding equipment with static magnetic, the CPT magnetometer based on rubidium 87 offers several attractive features over the optical pumping magnetometer, it has wide measuring rang and precision of 0.1nT, it effectively reduces the influence of temperature drift and frequency shift.