Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

A Subfemtotesla Atomic Magnetometer Based on Hybrid Optical Pumping of Potassium and Rubidium YANG LI, HONGWEI CAI, MING DING, WEI QUAN, JIANCHENG FANG, BeiHang University — Atomic magnetometers, based on detection of Larmor spin precession of optically pumped atoms, have been researched and applied extensively. Higher sensitivity and spatial resolution combined with no cryogenic cooling of atomic magnetometers would enable many applications with low cost, including the magnetoencephalography (MEG). Ultrahigh sensitivity atomic magnetometer is considered to be the main development direction for the future. Hybrid optical pumping has been proposed to improve the efficiency of nuclear polarization. But it can also be used for magnetic field measurement. This method can control absorption of optical pumping light, which is benefit for improving the uniformity of alkali metal atoms polarization and the sensitivity of atomic magnetometer. In addition, it allows optical pumping in the absence of quenching gas. We conduct experiments with a hybrid optically pumped atomic magnetometer using a cell containing potassium and rubidium. By adjusting the density ratio of alkali metal and the pumping laser conditions, we measured the magnetic field sensitivity better than 0.7 fT/sqrt(Hz).

Yang Li
BeiHang University

Date submitted: 27 Jan 2016 Electronic form version 1.4