Anisotropic hyperfine coupling and internal field in the van der Waals antiferromagnet of FePS3

Chia Nung Kuo,[1] Yang Kang Kuo,[2] and Chin Shan Lue[1]

[1] *Department of Physics, National Cheng Kung University, Tainan 70101, Taiwan*
[2] *Department of Physics, National Dong Hwa University, Hualien 97401, Taiwan*

We report a 31P nuclear magnetic resonance (NMR) study of two-dimensional (2D) van der Waals antiferromagnet of FePS3. To explore the anisotropic magnetic coupling, we have carried out the temperature-dependent Knight shift measurement on the single crystalline FePS3 with the external field perpendicular and parallel to the magnetic c* axis. The observations exhibit a distinctive difference with the crystalline orientation and the transferred hyperfine coupling constant for each oriented direction has been resolved. In the antiferromagnetic state, we have observed the splitting of the 31P NMR resonance line with the external field perpendicular to the c* axis while no such a splitting feature as the field parallel along the c* axis. It reveals the existence of the ordered static internal field at the phosphorous site and the direction of the internal field is parallel to its ab plane. Furthermore, the temperature evolution of the internal field obeys the 2D critical behavior, giving evidence for the Ising-type character in FePS3.