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μ SR Study in H₂O and D₂O

Even though there are several muon spin rotation and relaxation (μ SR) studies in water/ice [1-6], recently, we report the oscillation in the zero-field spectra of muons in ice which is attributed to the spin-dipole interactions between the muon in MuOH and neighboring protons and to hyperfine transitions of triplet states of axially symmetric anisotropic muonium in ice [7]. The Mu-H distance in MuOH found to be longer than the H-H distance in H₂O by 5%. To deepen the understanding of interaction of muon and its species with materials, we perform μ SR study in D₂O in which, like in ice, we observe the axially symmetric anisotropic muonium with nearly equal hyperfine transitions at zero-field in frozen phase. In addition, distinct frequencies corresponding to diamagnetic MuOH and MuOD were observed in H₂O and D₂O, respectively. In the program, temperature- and weak field-dependent μ SR study in H₂O and D₂O will be discussed.

[1] G.G. Myasishcheva, et al., *Sov. Phys. JETP* **26** (1968) 298.

[2] P. W. Percival, et al., *Chem. Phys. Lett.* **39** (1976) 333.

[3] K. Nagamine, et al., *Chem. Phys. Lett.* **87** (1982) 186.

[4] P. W. Percival, et al., *Chem. Phys.* **32** (1978) 353.

[5] P. W. Percival, et al., *Chem. Phys. Lett.* **93** (1982) 366.

[6] S. Cox, et al., *Hyperfine Interactions* **86** (1994) 747.

[7] A. D. Pant, et al., *Phys. Rev. B* **110** (2024) 104104.

Email

pant@post.kek.jp

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Supervisors Name

Supervisors Email

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Primary author: PANT, Amba Datt (KEK/J-PARC center)

Co-authors: Prof. KODA, Akihiro (KEK/J-PARC center); Prof. GEIL, Burkhard (Universität Göttingen); Prof. SAKAI, Hiromi (Nara Medical University); Dr NAKAMURA, Jumpei G. (KEK/J-PARC center); Dr ISHIDA, Katsuhiko (KEK/J-PARC center); Prof. SHIMOMURA, Koichiro (KEK/J-PARC center); Dr NISHIMURA, Shoichiro (KEK/J-PARC center); Dr COTTRELL, Stephen (ISIS, RAL)

Presenter: PANT, Amba Datt (KEK/J-PARC center)

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