

# 15th International Conference on Muon Spin Rotation, Relaxation and Resonance



Contribution ID: 222

Type: Poster

## The interaction between positive muons and multiple quadrupolar nuclei

*Tuesday, 30 August 2022 18:40 (20 minutes)*

A positively charged muon implanted in copper sits at an octahedral interstitial site and experiences a magnetic dipolar coupling with six nearest-neighbour quadrupolar  $I = 3/2$  copper nuclei [1]. The resulting avoided level crossing resonance observed as a function of magnetic field [2] provides a means of studying these interactions and understanding the effect of the electric-field gradient due to the muon experienced by the quadrupolar nuclei. The effect is usually modelled by considering the interaction between the positive muon and a single copper nucleus, but the other five copper nuclei are equally important. By solving the problem in the full  $2(2I + 1)^6 = 8192$ -dimensional Hilbert space, we demonstrate the effect of these additional interactions.

[1] M. Camani, F. N. Gygax, W. Rugg, A. Schenck, and H. Schilling, Phys. Rev. Lett. 39, 836 (1977).

[2] G. M. Luke, J. H. Brewer, S. R. Kreitzman, D. R. Noakes, M. Celio, R. Kadono, E. J. Ansaldo, Phys. Rev. B 43, 3284 (1991).

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**Session Classification:** Posters

**Track Classification:** Spin liquids and related phenomena