

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



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## Magnetic ground state of rutile-type oxide $\text{RuO}_2$ inferred from muon

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Ruthenium dioxide  $\text{RuO}_2$  is a well-known catalyst applied in various fields due to its high electrical conductivity and chemical stability. Although rutile  $\text{RuO}_2$  has long been regarded as a Pauli paramagnetic metal, recent neutron diffraction experiments and resonant X-ray scattering have suggested the presence of an antiferromagnetic order ( $T_N > 300$  K; Ru moment size  $\sim 0.05 \mu_B$ ) associated with the lattice distortion. This has triggered a growing interest regarding the details of the electronic state. We were thus motivated to investigate the magnetic ground state of high-quality single crystal  $\text{RuO}_2$  (residual resistivity ratio  $\text{RRR} > 1,000$ ) by muon spin rotation/relaxation experiment. We found no clear evidence from  $\mu\text{SR}$  measurements to suggest the development of a quasi-static antiferromagnetic order from 400 K to 4 K. The remaining possibility is that the muons happen to reside at a site where the internal magnetic field is canceling. In the presentation, we will also report the evaluation of muon site in the rutile structure deduced by first principles calculations to examine this possibility.

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