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μ SR study of real space magnetic phase separation in Mn_3O_4 ¹
ALEXANDER ZAKJEVSKII, ALEXANDER THALER, DALMAU REIG-I-
PLESSIS, ISAAC BRODSKY, YEWON GIM, University of Illinois - Urbana,
ADAM ACZEL, Oak Ridge National Laboratory, S. LANCE COOPER, GRE-
GORY MACDOUGALL, University of Illinois - Urbana — The material Mn_3O_4
is a magnetically frustrated spinel which exhibits three distinct magnetic transitions
below 42 K. Recent work has shown that the lowest of these is accompanied by an
orthorhombic structural distortion, implying strong magneto-elastic coupling. Mag-
netic force microscopy (MFM) measurements indicate a substantial region of phase
coexistence below this transition, with domain walls that order on the mesoscale.
It is further suggested that a tradeoff in ordered volume with field may play a role
in the recent quantum phase transition reported in this material. To follow up on
these ideas, we have performed a series of zero- and transverse-field muon spin ro-
tation measurements on single-crystal Mn_3O_4 . The zero-field data clearly show the
co-existence of ordered and disorder volumes, consistent with MFM results. Here
we report these data, and further attempts to vary the ordered volume with applied
field. We will discuss both zero- and transverse-field results within the context of
the current understanding of the material.

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Alexander Zakjevskii
University of Illinois - Urbana

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