Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

NMR studies of the internal electric field in a single crystal of the quasi-one-dimensional conductor $\mathbf{Li_{0.9}Mo_6O_{17}}$ GUOQING WU, Yangzhou University, BING WU, Fayetteville State University — The quasi-one-dimensional (Q1D) conductor $Li_{0.9}Mo_6O_{17}$ is of considerable interest because it has a highly conducting phase with properties likely associated with a Luttinger liquid, a poorly understood "metal-insulator" crossover at temperature $T_{MI} = 24$ K, and a 3D superconducting phase that may involve triplet Cooper pairs at $T_c = 2.2$ K, while the mechanism for many of its properties has been a long mystery and it presents tremendous experimental challenges. We report the ^{7}Li-NMR measurements of the internal electric field with an externally applied magnetic field $B_0 = 9$ - 12 T, and we also show our theoretically calculated result of the electric field based on the structure of the crystal lattice. We find that the ^{7}Li-NQR frequency (ν_Q) has a value of ~ 45 kHz and the electric field gradient (EFG) at the Li site due to the charges of the surrounding Mo conduction electrons has an axial symmetry with the principle axis (p_z) to be along the lattice a-axis. There is no temperature or field dependence for the value of ν_Q or EFG, indicating that the "metal-insulator" crossover has a magnetic origin, rather than the charge density wave (CDW) as one of the possible mechanisms previously thought in literature.

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Date submitted: 14 Nov 2014 Electronic form version 1.4