Magnetic structure and properties of a Sr_3CuIrO_6 spin chain

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We have studied the magnetic structure and properties of Sr_3CuIrO_6 as a function of temperature and field, using susceptibility (χ_{ac}), magnetisation (M), and neutron powder diffraction. Three characteristic temperatures T_2=17 K and T_1=5.5 K and T_f $\sim$ 5 K were observed in the χ_{ac} data. T_1 is only detectable in the presence of an applied field perpendicular to $\langle 101 \rangle$. T_2 and T_f are present both with and without applied field but are field dependent. T_f shows strong frequency dependence indicating spin glass behavior, which is supported by magnetization data, in both $M(T)$ and $M(H)$. T_2 data also shows evidence of frequency-dependence indicating a glassy phase. We believe the phases above and below T_f are distinct and of different origin. No evidence of long range magnetic order was found using neutron powder diffraction.