Magnetic instabilities in $K_2Cr_3As_3$

A. Galluzzi,$^{1,2}$ G. Cuono,$^3$ A. Romano,$^{1,2}$ J. Luo,$^{4,5,6}$ C. Autieri,$^{2,3}$
C. Noce,$^{1,2}$ and M. Polichetti$^{1,2}$

$^1$Department of Physics “E.R. Caianiello”,
University of Salerno, via Giovanni Paolo II,
132, Fisciano (SALERNO), I-84084, Italy
$^2$CNR-SPIN Salerno, via Giovanni Paolo II,
132, Fisciano (SALERNO), I-84084, Italy
$^3$International Research Centre Magtop,
Institute of Physics, Polish Academy of Sciences,
Aleja Lotników 32/46, PL-02668 Warsaw, Poland
$^4$Beijing National Laboratory for Condensed Matter Physics and Institute of Physics,
Chinese Academy of Sciences, Beijing 100190, China
$^5$Songshan Lake Materials Laboratory,
Dongguan, Guangdong 523808, China
$^6$School of Physical Sciences, University of Chinese
Academy of Sciences, Beijing 100190, China

The magnetic response of a $K_2Cr_3As_3$ sample has been studied by means of dc magnetization measurements as a function of magnetic field (H) at different temperatures ranging from 5 K up to 300 K. Looking at the magnetic hysteresis loops m(H), a diamagnetic behavior of the sample has been inferred at temperatures higher than 60 K, whereas at lower temperatures the sample shows a ferrimagnetic behavior. Moreover, several spike-like magnetization jumps, both positive and negative, have been observed at certain fields in the range $-1000 \text{ Oe} < H < 1000 \text{ Oe}$, regardless of the temperature considered. The field position of the magnetization jumps has been studied at different temperatures, and their distribution can be described by a Lorentzian curve. Finally, a possible explanation of the microscopic mechanisms leading to the presence of these magnetization instabilities has been provided.