# AC Susceptibility

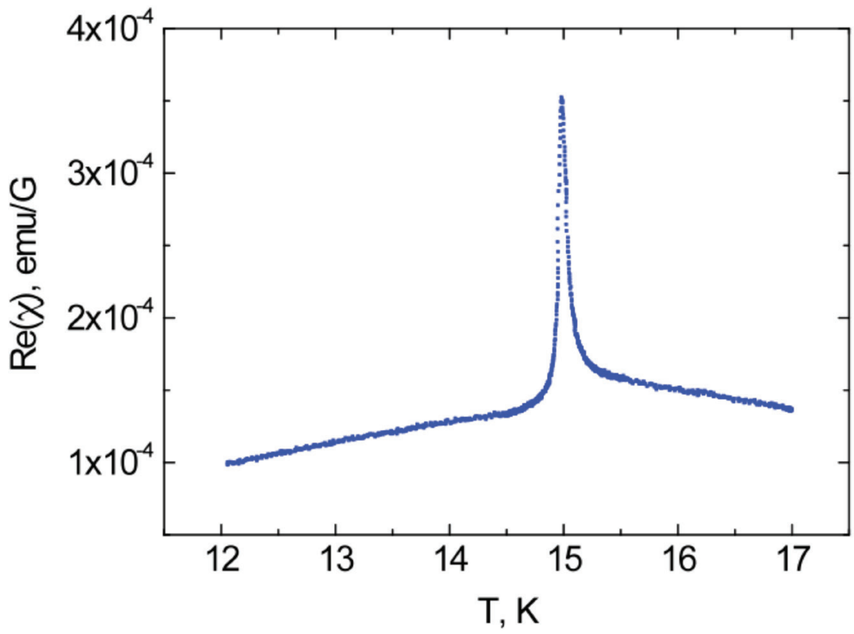
## Measurement Data

### Real part of AC Susceptibility as a function of temperature

| | |
|---|---|
| System | CFMS-14T |
| Description of measurement | AC susceptibility with sample stationary inside coils set |
| Measurement protocol | Position the sample at the centre of the pick-up coil.<br>Compensate background at 12 K<br>Take readings at continuous temperature ramp. |
| Samples | Antiferromagnetic material<br>Data courtesy of Dr Inaki Orue, University of Bilbao |

### Comments

Real part of AC susceptibility across an antiferromagnetic phase transition. The peak width of approximately 0.1 K is clearly resolved.



# AC Susceptibility

## Measurement Data

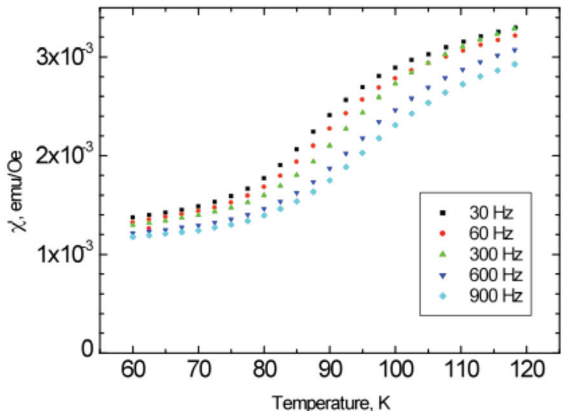
### Real and Imaginary parts of AC Susceptibility as a function of temperature

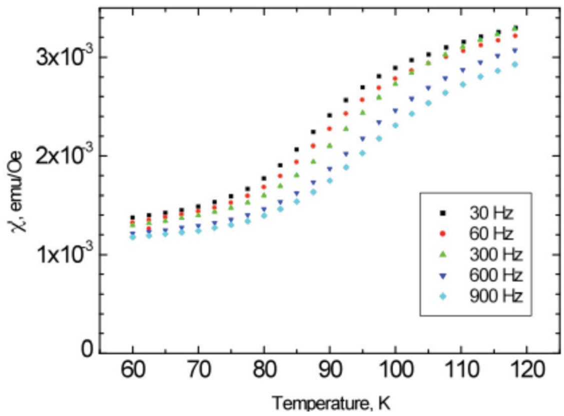
| System | CFMS-9T |
|---|---|
| Description of measurement | AC susceptibility with sample extraction from the coils set and compensation of background signal. |
| Measurement protocol | Settle the temperature<br>Set the frequency and amplitude of AC excitation field<br>Run the compensation procedure<br>Record data as sample is moved along the axis of coils set<br>Measurement time: 10 min per temperature point typically |
| Samples | Ni2Mn2-xSnx (spin glass)<br>Metallic sample<br>Data courtesy of Prof S. Majumdar, IACS, Kolkata |

### Comments

In a spin glass the AC susceptibility is strongly affected by spin dynamics hence the position of the phase transition depends on the frequency of the excitation field.

The data demonstrate a regular frequency dependence and correct discrimination between x  and x  (i.e. the phase of the measured signal is set accurately so that the contributions due to x  and x are separated correctly and are not mixed).



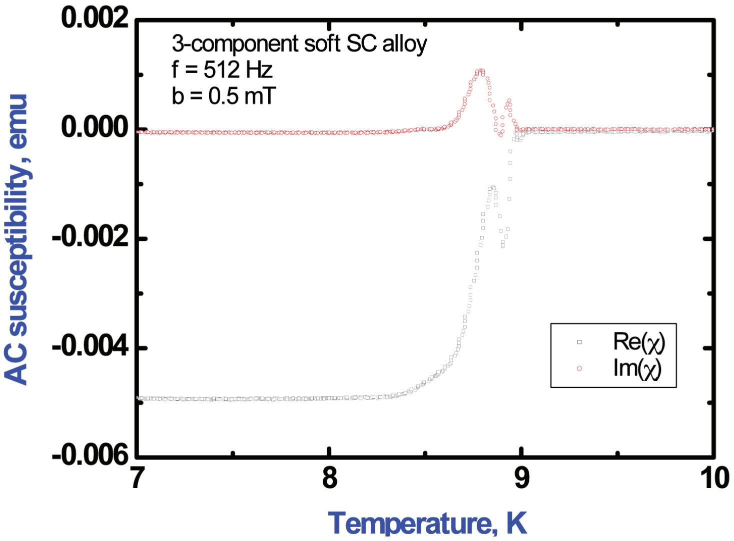



# AC Susceptibility

## Measurement Data

### Temperature dependence of the AC susceptibility of a superconducting alloy

At low temperatures the sample is in the Meissner state, with pure diamagnetic response (real part of the complex susceptibility, is negative, Re(x)<0) and no dissipation (Im(x)=0). As the sample approaches the critical temperature, Tc, The magnetic field starts to penetrate into the bulk of the sample, causing movement of magnetic vortices. This is reflected in the decrease of Re(x) and simultaneous appearance of a peak in Im(x). Additional sharper peaks in both Re(x) and Im(x) in the close vicinity of Tc are associated with the peak effect (enhanced pinning due to softening of the vortex lattice).




### Temperature dependence of the AC susceptibility of a superconducting alloy