

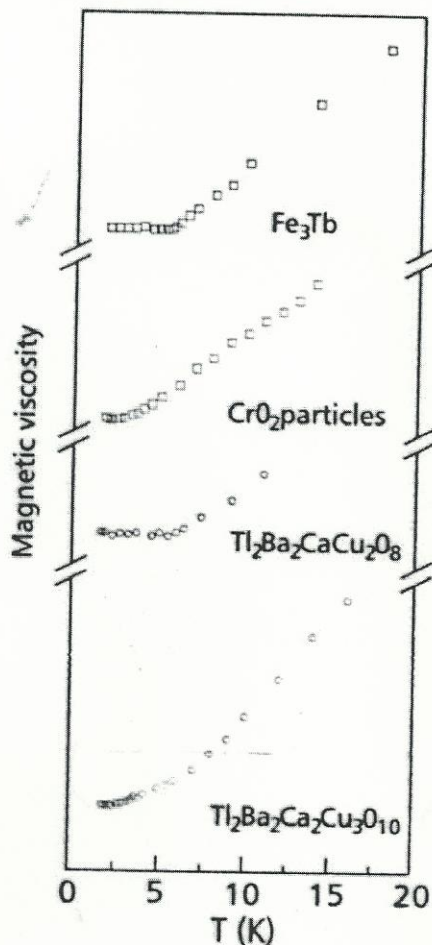
# Spanish researchers probe quantum relaxation

**A**t low temperatures, quantum effects dominate magnetic relaxation in magnetic systems and high temperature superconductors. This is one of the conclusions of a paper by Javier Tejada, X Xiang Zhang and Antoni Garcia of Barcelona University which was received recently by *Research Matters*.

The paper reviews the inherent properties of magnets and high temperature superconductors. It states that magnetic relaxation occurs in two stages - one fairly rapid in which the energy barriers are removed from the field, the other slower and, at normal temperatures, the result of thermal activation. At low temperatures, however, the paper shows that there is a crossover temperature below which the quantum effect becomes more powerful.

The results of experimental work carried out on many different systems show that the temperature dependence of magnetic viscosity directly reflects the change in relaxation mechanism. As can be seen in the Figure, the linear dependence in the thermal activation region levels off to a temperature independent constant value in the region of quantum relaxation. The crossover temperature is related to the height of the energy barriers of each system and can be changed by varying the externally applied field.

The authors plan to use an Oxford Instruments' Kelvinox series dilution refrigerator to extend their measurements into the mK range of temperatures so they can obtain a better understanding of the mechanism of dissipation and thermal assisted quantum relaxation.



If you would like any further information about this work, please contact Javier Tejada, Departament de Física Fonamental, Facultat de Física, Universitat de Barcelona, Av. Diagonal, 647-E-08028 Barcelona, Spain.