

# OVERVIEW ON THE PHYSICS OF THE COMPLEX PHASE DIAGRAM OF $\text{CeNi}_{1-x}\text{Cu}_x$

**José C. Gómez Sal**

Department of Condensed Matter Physics, University of Cantabria, Santander, Spain

Intrinsic disorder in Strongly Correlated Electrics Systems has been since many years a strong point to discussion, giving rise to several theories considering such disorder to understanding non Fermi liquids, magnetic clusters, etc.

During last years we have performed intensive work in order to characterise and try to understand the complex physics underlying on the  $\text{CeNi}_{1-x}\text{Cu}_x$  system. In this system, the existence of magnetic clusters has been evidenced and the ferromagnetism is established at low temperature by means of a percolative processes.

We will focus in this paper on a detailed discussion of the phase diagram, analysing the different situations depending on the composition. In this way we describe the situation of the Ce rich side, where pure AF structure are present, and no magnetic clusters are detected. Increasing the Ni content, ferromagnetism appears at very low temperature, while increasing temperature a cluster glass state appears just below the paramagnetic region. In the Ni rich side, the long range ordering has disappeared. We discuss the validity of the general scheme for the different situations, depending on the strength of the magnetic interactions involved.

A special emphasis is made on the evolution to the non magnetic Ce state found in  $\text{CeNi}$ , as well as on recent theoretical models on phase diagrams with spin glass and hysteresis cycles with steps related to the existence of magnetic clusters.

The phase diagram is also analysed from the point of view of quantum critical point or non Fermi liquid behaviour.