CNR ISMN
ISTITUTO PER LO STUDIO DEI MATERIALI NANOSTRUTTURATI

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DIPARTIMENTO DI FISICA E ASTRONOMIA
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Giovedì 5 Dicembre 2019
Ore 11, sala 213 Centro Congressi CNR
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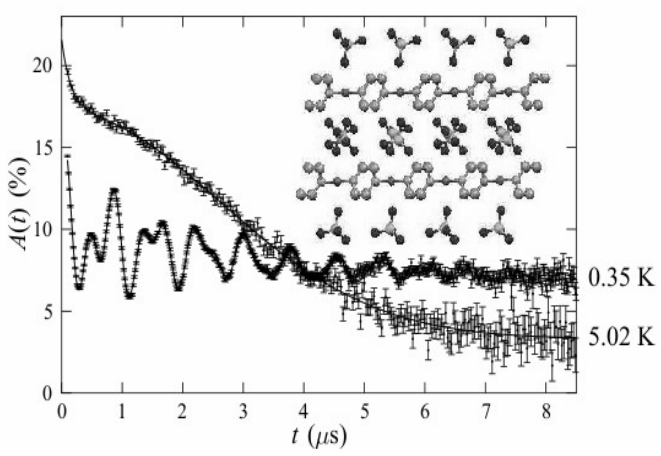
Low dimensional and topological states in molecular magnets and beyond



Low-dimensional quantum magnetism continues to be of great theoretical and experimental interest, as reduced dimensionality supports strong quantum fluctuations that can result in novel excitations and critical behaviour.
Of particular recent importance is the understanding the physics in reduced dimensions using notions from topology. Examples include topological objects such as walls, vortices and skyrmions, which exist in the spin textures of a range of magnetic systems, and one-dimensional spin chain systems, where topological considerations are key in elucidating the possible ground states and excitation spectra.
Here we discuss our recent results in this area, with an emphasis on the use of muon-spin relaxation as a sensitive probe of emergent magnetism in spin chains and ladders. Muons have repeatedly been shown to be sensitive to long-range magnetic order in these systems, which is often very difficult to observe using other techniques, and also to low-energy dynamics [1, 2].

[1] T. Lancaster et al., Phys. Rev. Lett. 112, 207201 (2014).
[2] T. Lancaster et al., New. J. Phys. 20, 103002 (2018).