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Abstract for an Invited Paper
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Quantum Criticality and Superconductivity in Spin and Charge Systems

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This talk will focus on experimental search and discovery of novel forms of quantum order in metallic and insulating magnets, intercalated compounds, ferroelectric systems and multi-ferroic materials. Particularly discussed will be the pressure-induced superconductivity and critical phenomena in the vicinity of quantum phase transitions. Materials tuned to the neighbourhood of a zero temperature phase transition often show the emergence of novel quantum phenomena. Much of the effort to study these new emergent effects, like the breakdown of the conventional Fermi-liquid theory in metals has been focused in narrow band electronic systems. But Spin or Charge ordered phases in insulating systems can also be tuned to absolute zero using hydrostatic pressure. Close to such a zero temperature phase transition, physical quantities like resistivity, magnetisation and dielectrics constant change into radically unconventional forms due to the fluctuations experienced in this region giving rise to new kinds ordered states including superconductivity in the metallic systems