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Unconventional quantum criticality in insulators and metals

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In the last few years it has become clear theoretically that many quantum critical phenomena fall beyond the standard order parameter based description developed originally for thermal phase transitions. Examples include deconfined quantum critical points in insulators and quantum phase transitions associated with the disappearance of a Fermi surface in metals. In this talk I will focus on the important example of the Mott metal- insulator transition. I will describe a number of theoretical developments on unconventional quantum criticality that are potentially pertinent to our understanding of phenomena in the vicinity of the Mott transition. I will discuss some of the implications for experiments on the Mott transition itself as well as for heavy electron non-fermi liquids and cuprate metals.