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Deconfined Criticality in a $J-Q$ model on Honeycomb lattice SUMIRAN PUJARI, FABIEN ALET, LPT, IRSAMC, Université Paul Sabatier, Toulouse, France, KEDAR DAMLE, TIFR, Mumbai, India — The Deconfined Criticality scenario[1] describes in the context of quantum magnets a generic non-Landau second-order transition between two orders that break different symmetries - antiferromagnetic order that breaks $SU(2)$ symmetry and Valence bond (VB) order breaking lattice translational symmetry. We investigate this physics in the context of a $J-Q$ model[2] on the honeycomb lattice using both $T=0$ Projector Quantum Monte Carlo (QMC) and finite-T Stochastic Series Expansion QMC techniques. We find evidence for a continuous transition from different measurements including scaling of Néel and VB order parameters, Binder ratios of staggered magnetization, stiffness and uniform susceptibility. We have indications that this critical point belongs to the same universality class as the one observed on square lattice $J-Q$ model. Our results also suggest that this critical fixed point controlling deconfined critical behaviour remains essentially unchanged even on the honeycomb lattice which allows three-fold hedgehog defects in the Néel order to be present in the continuum description of the critical point.

[1]T. Senthil *at al*, Science 303, 1490 (2004).
[2]A. W. Sandvik, Phys. Rev. Lett. 98, 227202 (2007).

Sumiran Pujari
LPT, IRSAMC, Université Paul Sabatier, Toulouse, France

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