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**Multiply charged monopoles in cubic dimer model** SREEJITH GANESH JAYA, Max Planck Institute for Physics of Complex Systems, STEPHEN POWELL, The University of Nottingham — The classical cubic dimer model is a 3D statistical mechanical system whose degrees of freedom are dimers that occupy the edges between nearest neighbour vertices of a cubic lattice. Dimer occupancies are subject to the local constraint that every vertex is associated with exactly one dimer. In the presence of an aligning interaction, it is known that the system exhibits an unconventional continuous thermal phase transition from a symmetry broken columnar phase to a Coulomb-phase. The transition is in the NCCP$^1$ universality class, which also describes the Neel-VBS transition in the JQ model and the $S = \frac{1}{2}$ Heisenberg model with suppression of hedgehog defects. Using Monte-Carlo simulations of a pair of defects in a background of fluctuating dimers, we calculate the scaling exponents for fugacities of monopole defects of charge $Q = 2$ and 3 at this critical point. Our estimates suggest that $Q = 3$ monopoles are relevant and could therefore drive the JQ model away from the NCCP$^1$ critical point on a hexagonal lattice.

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