

Abstract Submitted  
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**Kekule quantum criticality from Dirac fermion fluctuations:  
a functional RG approach** LAURA CLASSEN, Heidelberg University and  
Brookhaven National Laboratory, MICHAEL SCHERER, Heidelberg University,  
IGOR HERBUT, Simon Fraser University — We consider a system of Dirac fermions  
coupled to a  $Z_3$  order parameter field as it occurs in the Kekule valence bond solid on  
the honeycomb lattice. From Landau-Ginzburg paradigm, a discontinuous nature of  
the corresponding phase transition is expected due to the possibility of cubic terms  
in the free energy. This, however, has been challenged by scaling corrections due  
to fermionic quantum fluctuations (arXiv:1609.03208, arXiv:1610.07603). We study  
the modifications of scaling and the fixed point structure of a Gross-Neveu-Yukawa  
theory for this system employing the non-perturbative functional renormalization  
group. This enables a direct evaluation of critical behavior in 2+1 dimensions for an  
arbitrary number of fermions and provides access to non-perturbative information  
of the scalar effective potential.

Laura Classen  
Heidelberg University and Brookhaven National Laboratory

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