

# Condensed Matter Theory Seminar

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## Dirac Spin Liquid on the Spin-1/2 Triangular Heisenberg Antiferromagnet

We study the spin liquid candidate of the spin-1/2  $J_1$ - $J_2$  Heisenberg antiferromagnet on the triangular lattice by means of density matrix renormalization group (DMRG) simulations [1]. By applying an external Aharonov-Bohm flux insertion in an infinitely long cylinder, we find unambiguous evidence for gapless  $U(1)$  Dirac spin liquid behavior [2]. The flux insertion overcomes the finite size restriction for energy gaps and clearly shows gapless behavior at the expected wave-vectors. Using the DMRG transfer matrix, the low-lying excitation spectrum can be extracted, which shows characteristic Dirac cone structures of both spinon-bilinear and monopole excitations. Finally, we confirm that the entanglement entropy follows the predicted universal response under the flux insertion [2,3].

[1] Phys. Rev. X 7, 031020 (2017). [2] arXiv:1905.09837 (PRL accepted). [3] Science Advances 4, eaat5535 (2018).

**Thursday, 31.10.2019, 14:15 Uhr**  
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