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Signature of the chiral magnetic effect on the lattice.

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Lattice quantum chromodynamics (QCD) has provided great insight into the nature of empty space, but quantum chromodynamics alone does not describe the vacuum in its entirety. Recent developments have introduced Quantum Electrodynamics (QED) effects directly into the generation of lattice gauge field configurations. Using lattice ensembles incorporating fully dynamical QCD and QED effects we are able to reveal for the first time evidence suggesting an interplay between these two forces. This is remarkable as gluons and photons, the force carriers of chromodynamics and electrodynamics respectively, do not interact directly and can only interact via the fully dynamical virtual quark-anti-quark pairs in the vacuum. By considering $j \cdot B$ and topological charge density q across the lattice we are able to quantitatively observe a correlation that may be associated with the chiral magnetic effect.

Consider for promotion

No

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