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Magnetic knots of deconfined CP-odd matter in heavy-ion collisions

We show that the local parity violation in the quark-gluon plasma supports existence of free (meta)stable knots of deconfined hot quark matter stabilized by superstrong magnetic fields. The magnetic field in the knots resembles the spheromak plasma state of the magnetic confinement approach to nuclear fusion. The size of the knot is quantized, being inversely proportional to the chiral conductivity of the quark-gluon plasma. The parity symmetry is broken inside the knot. A specific flavor content and azimuthal distribution of particles produced in decays of the knots may serve as good experimental signatures of these unusual objects in heavy-ion collisions.

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