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Extreme magnetic fields during pre-equilibrium in heavy-ion collisions

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The quark-gluon plasma produced in heavy-ion collisions is a state of matter where quarks and gluons are, for a few instants, in a deconfined state, not bound inside hadrons. The deconfinement is driven by an extremely high temperature produced in the collisions. Besides the high temperature, it is expected that non-central collisions produce the highest magnetic fields we know in nature or in the laboratory. Although the intensity drops down fast and, moreover, it is not clear whether the fields last long enough to induce a magnetization during the quark-gluon plasma phase, most of the models and simulations predict a significant intensity that lasts up to proper times of order 1 fm after the beginning of the reaction. In this seminar, I will discuss possible effects these extreme fields can induce during the first stage after the collision, period when the field is at its maximum. I will also discuss perspectives to define observables for these fields.

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