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# Quark Gluon Plasma: the fastest rotating fluid

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The extreme energy densities generated in ultra-relativistic heavy ion collisions produce a state of matter that behaves surprisingly like a fluid, with exceptionally high temperature and low viscosity. Non-central collisions have angular momenta of the order of 1,000ħ, and the resulting fluid may have a strong local rotational structure. Spin–orbit coupling can lead to preferential orientation of particle spins along the direction of rotation. I will present STAR measurements (Nature 548 (2017) 62, arXiv:1701.06657) of an alignment between the global angular momentum of a non-central collision and the spin of emitted particles, revealing that the fluid produced in heavy ion collisions is the most vortical system so far observed. I will also briefly discuss observable effects due to strong magnetic fields produced in ultra-relativistic heavy ion collisions related to the restoration of fundamental symmetries of quantum chromodynamics.

**Presenter:** SUMBERA, Michal (NPI Prague)