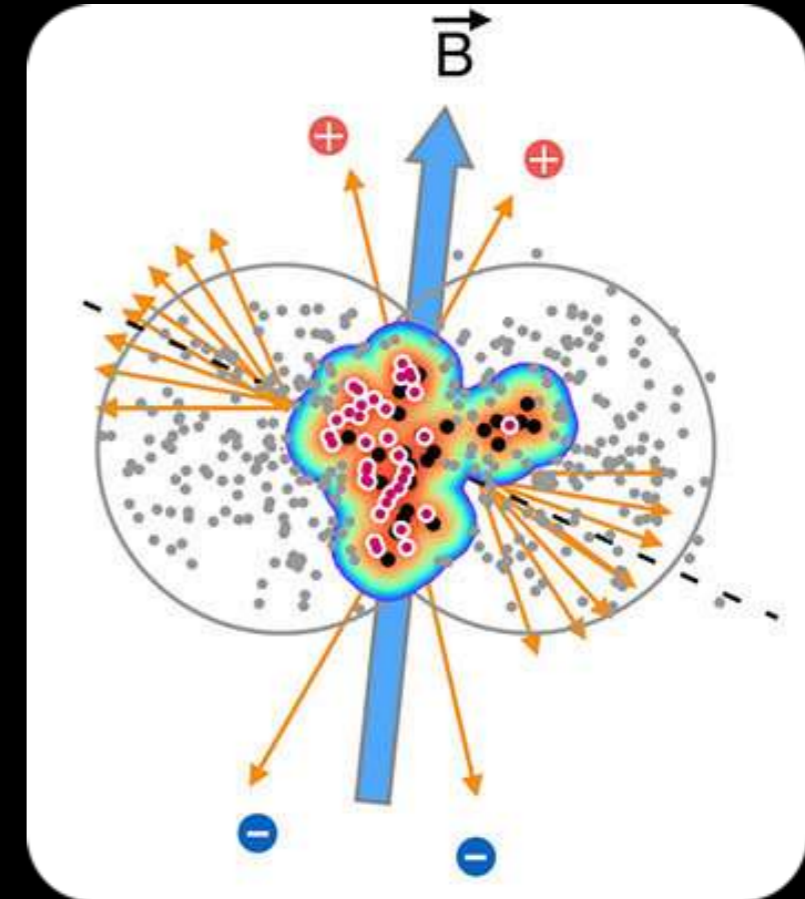
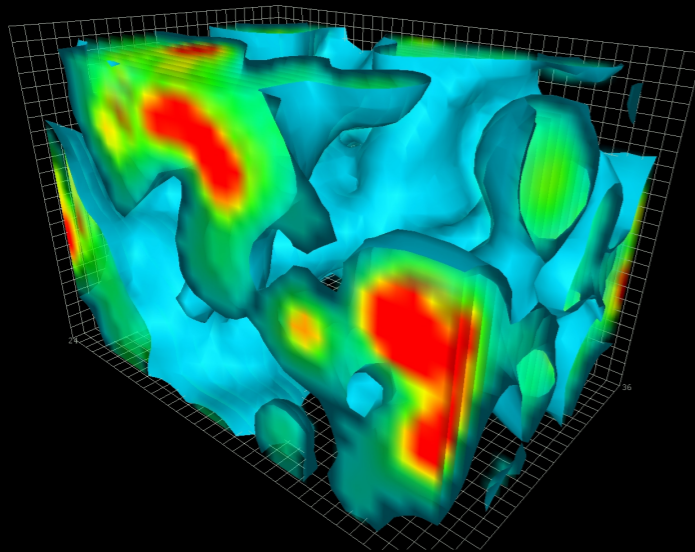


## Looking for the early stage magnetic field in heavy ion collisions

Novel QCD phenomena associated with parity violation in strong interactions  
(Chiral Magnetic Effect - CME)

“Catalysed” by the presence of the strongest magnetic field in nature ( $\sim 10^{18}$  Gauss)

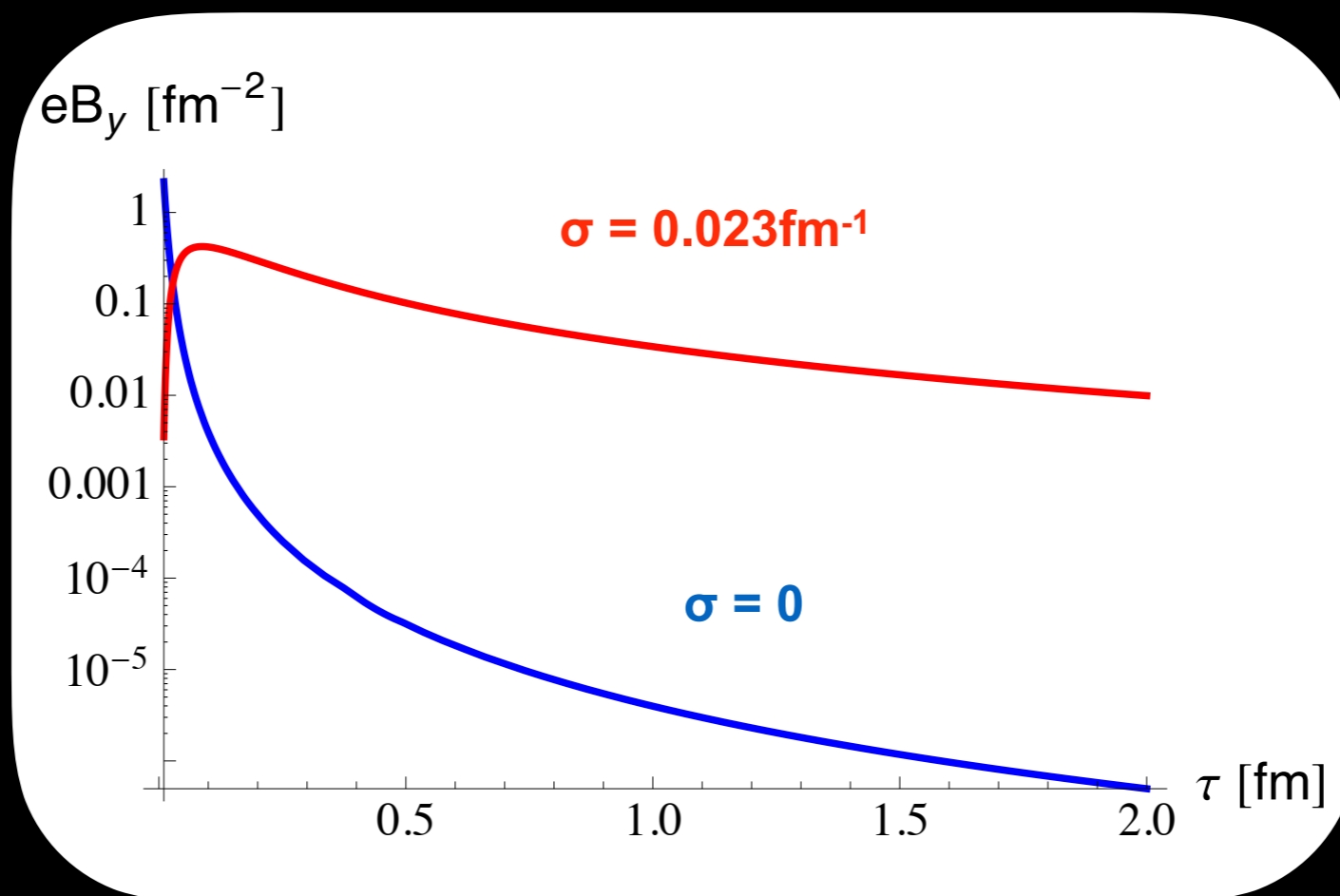
Animation @ <http://www.physics.adelaide.edu.au/theory/staff/leinweber/VisualQCD/Nobel/>



E. Shuryak *World Sci. Lect. Notes Phys.* **8** (1988)  
D. Kharzeev *et al.*, *Phys. Rev. Lett.* **81** (1998) 512

V. Skokov *et al.*, *Int. J. Mod. Phys. A* **24** (2009)  
U. Gürsoy *et al.*, *Phys. Rev.* **C89**, (2014) 054905

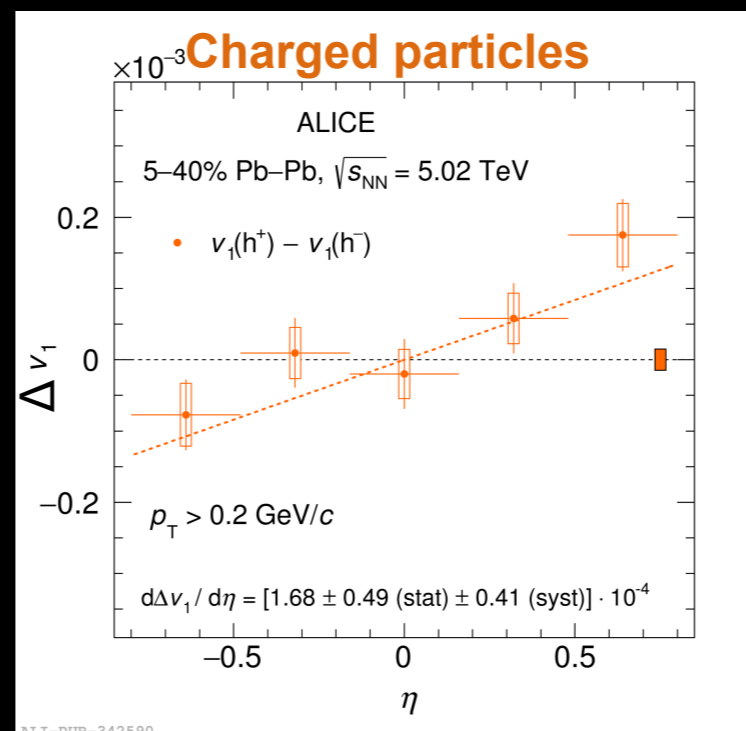
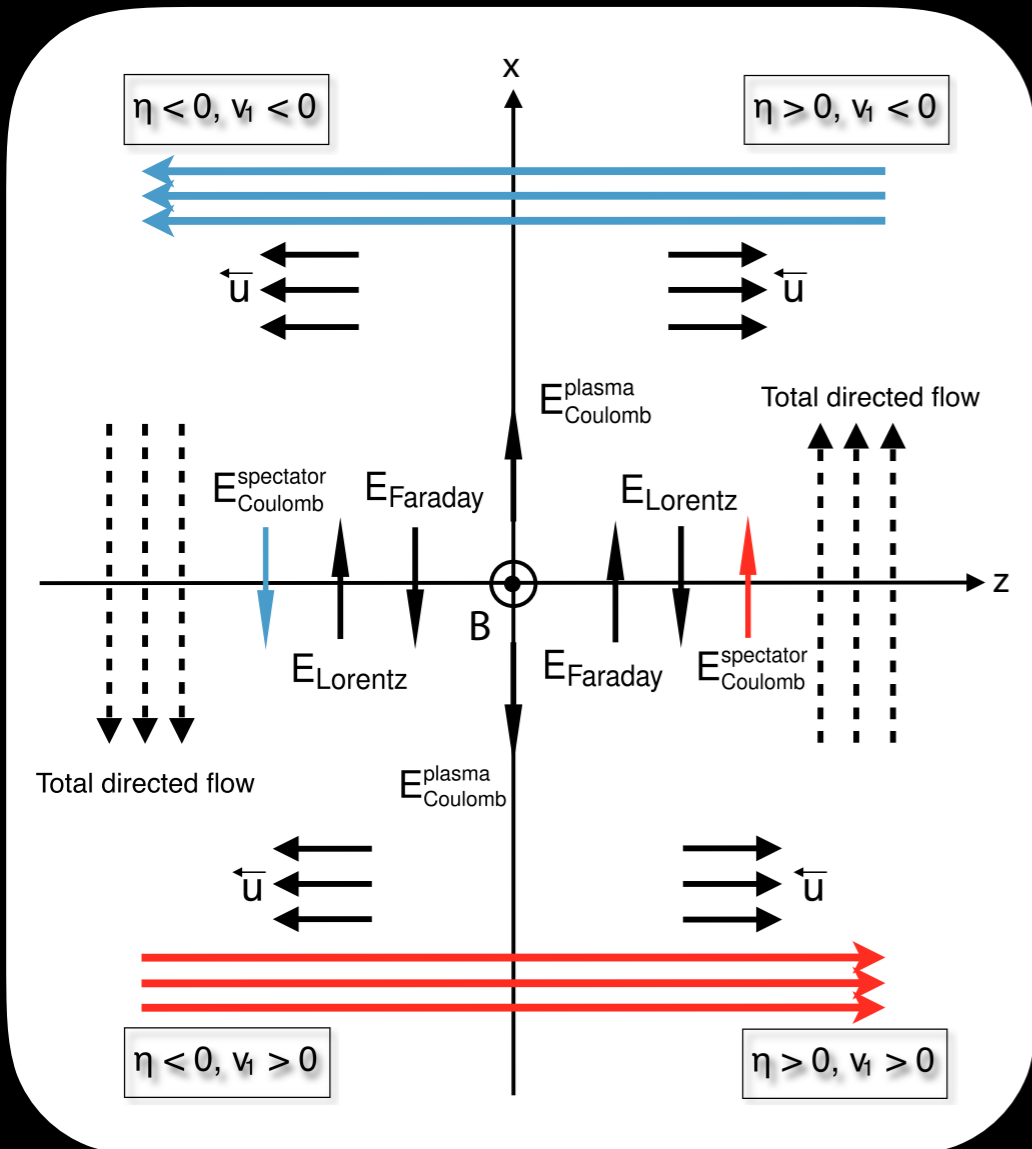
Panos Christakoglou  
for the Nikhef/UU ALICE group

U. Gürsoy *et al.*, Phys. Rev. C89, (2014) 054905

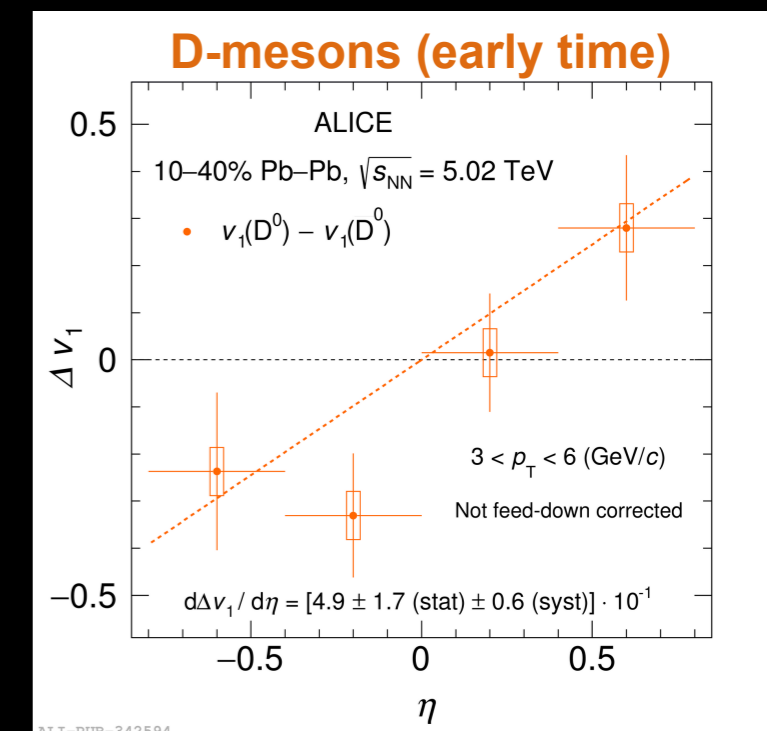
- ✓ The field decays rapidly
- 👁 Decay rate depends on the electric conductivity of the medium
- 👁 Conductivity depends (in principle) on temperature
- Poorly constrained so far by experiments

U. Gürsoy *et al.*, Phys. Rev. **C98**, (2018) 055201

(ALICE Collaboration), arXiv:1910.14406

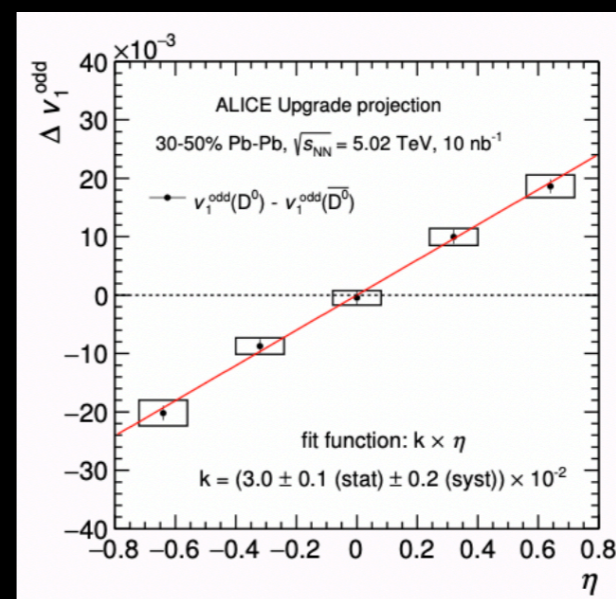


$\Delta v_1 \neq 0$  with a  $2.6\sigma$  significance



$\Delta v_1 \neq 0$  with a  $2.7\sigma$  significance

Run 3 projection



- ✓ Competing effects: Faraday + spectator Coulomb vs Lorentz force
- ✓ Initial stage E/M fields could affect the motion of particles → experimentally accessible differences in charge dependent odd  $v_n$

