

Abstract Submitted  
for the APR13 Meeting of  
The American Physical Society

**Azimuthally fluctuating magnetic field and its impact on observables in heavy-ion collisions** JOHN BLOCZYNSKI, XU-GUANG HUANG, Indiana University, XILIN ZHANG, Ohio University, JINFENG LIAO, Indiana University & RIKEN BNL Research Center — The heavy-ion collisions can produce extremely strong transient magnetic and electric fields that may generate interesting effects such as the Chiral Magnetic Effect. An important missing link is the orientation of the fluctuating E and B fields with respect to the fluctuating matter geometry in the same event. In this presentation, we report for the first time the azimuthal fluctuation of these fields and their correlations with the also fluctuating matter geometry (characterized by the participant plane harmonics) using event-by-event simulations. A sizable suppression of the angular correlations between the magnetic field and the *2nd* and *4th* harmonic participant planes is found in very central and very peripheral collisions, while the magnitudes of these correlations peak around impact parameter  $b \sim 8 - 10$  fm for RHIC collisions. This can lead to notable impacts on a number of observables related to various magnetic field induced effects, and our finding suggests that the optimal event class for measuring them should be that corresponding to  $b \sim 8 - 10$ . we also propose new new measurements that can help fully mapping out the azimuthal correlation patterns of charged particles. [J. Bloczynski, X. Huang, X. Zhang, J.Liao, sarXiv:1209.6594, Phys. Lett. B in press.]

Jingeng Liao  
Indiana University & RIKEN BNL Research Center

Date submitted: 07 Jan 2013

Electronic form version 1.4