Contribution ID: **31** Type: **not specified**

Chiral Magnetovortical Instability and Dynamo

We study the collective modes in chiral plasma based on the chiral magnetohydrodynamics. We find that there exists a new unstable mode which signals the presence of a plasma instability in nonrelativistic limit. The new plasma instability is named as the Chiral Magnetovortical Instability (CMVI), because the chiral vortical effect and the dynamical electromagnetic field are both included. The CMVI will happen once the chiral vortical transport coefficient is larger than the summation of the energy density and the pressure $e+P$. This instability is unlike the usual "chiral plasma instability" which stems from the chiral magnetic effect, it is present for any large value of the wave vector $|\mathbf{k}|$. A simple explanation on the CMVI is the coupling between the Alfven wave and the chiral Alfven wave, these two waves are due to the magnetic tensor force and the Lorentz force as a restoring force separately. Both waves do not show the instability, but they affect each other then lead to the CMVI. Generally, the instability means that the magnetic field increases with times, this is conventionally termed a Dynamo effect. Thus the CMVI will become a dynamo which can generate and maintain the magnetic field and also supplies a possible mechanism for the origins of the magnetic field in astrophysical bodies like stars,planets,etc. Later, we argue the fate of the CMVI and briefly discuss its relevance in heavy ion collisions.

Primary authors: WANG, Shuai (Fudan University); HUANG, Xu-Guang (Fudan University)

Presenter: WANG, Shuai (Fudan University)