

HW#1**Due 3/13**

Derive the mass continuity equation

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \bar{u}) = 0$$

from taking zero moment of Vlasov equation

$$\int_{-\infty}^{+\infty} m \frac{df}{dt} d\bar{v} = 0$$

where $\frac{df}{dt} = \frac{\partial f}{\partial t} + \bar{v} \cdot \nabla f + \bar{a} \cdot \nabla_{\bar{v}} f = 0$

$$\bar{a} = \frac{\bar{F}}{m} = \frac{q}{m} (\bar{E} + \bar{v} \times \bar{B})$$

$$f(\bar{v} = \pm\infty) = 0$$