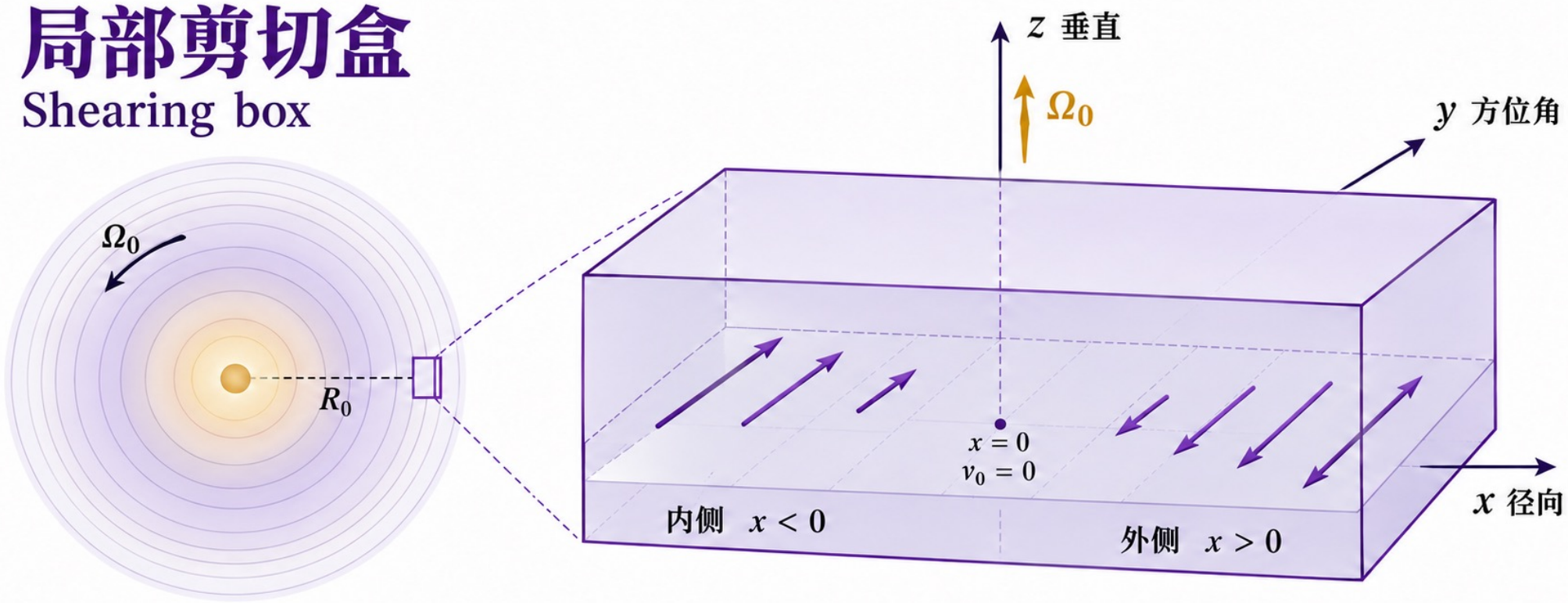
局部剪切盒
Shearing box



$$x = r - R_0 \qquad y = R_0(\varphi - \Omega_0 t) \qquad z = z$$

$$\boldsymbol{v}_0 = -q\Omega_0 x\,\boldsymbol{e}_y \qquad q = -\frac{d\ln\Omega}{d\ln r} = \frac{3}{2}\ \text{（开普勒盘）}$$

随 R_0 处轨道共转的局部参考系

Having all the forces combined, MHD equations in a shearing-sheet read

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \boldsymbol{v}) = 0 \ ,$$
$$\frac{\partial \boldsymbol{v}}{\partial t} + (\boldsymbol{v} \cdot \nabla)\boldsymbol{v} = -\frac{\nabla P}{\rho} + [2\boldsymbol{v} \times \boldsymbol{\Omega}_K + 3\Omega_K^2 x \boldsymbol{e}_x] + \frac{1}{4\pi\rho}(\nabla \times \boldsymbol{B}) \times \boldsymbol{B}$$
$$\frac{\partial \boldsymbol{B}}{\partial t} = \nabla \times (\boldsymbol{v} \times \boldsymbol{B}) \ .$$