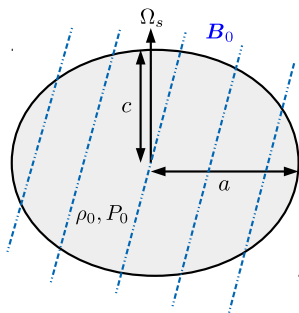
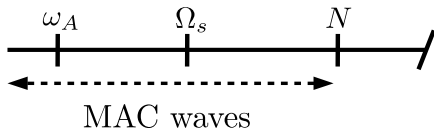


# POLYNOMIAL EXPANSION OF COMPRESSIBLE MODES IN ROTATING RIGID ELLIPSOIDS

J r mie Vidal (Leeds), Sylvie Su & David C bron (Grenoble)



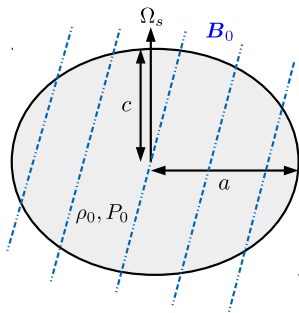
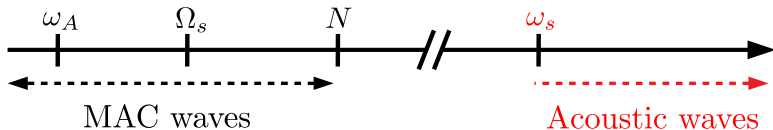
Schematic model

- ▶ **Rotating, stratified** and electrically conducting fluid,
- ▶ **Ellipsoidal** geometry,
- ▶ **Nonlinear couplings: instabilities & turbulence.**

👉 **MAC waves = flow dynamics**

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Schematic model

- ▶ Rotating, stratified and electrically conducting fluid,
- ▶ Ellipsoidal geometry,
- ▶ Nonlinear couplings: instabilities & turbulence.

👉 MAC waves = flow dynamics

- ▶ Acoustic waves sensitive to flow properties,
- ▶ Modal acoustic velocimetry (Triana et al., 2014).

👉 Acoustic waves = "probes"

Nonlinear eigenvalue problem

$$\omega^2 \mathcal{A}_2(\mathbf{u}) + \omega \mathcal{A}_1(\mathbf{u}) + \mathcal{A}_0(\mathbf{u}) = 0.$$

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$$\mathbf{u} = \nabla \times \mathbf{A} + \nabla \Phi$$

- ▶ BC on  $\mathbf{A}$ : non-penetration  $\mathbf{1}_n \cdot (\nabla \times \mathbf{A}) = 0$ .
- ▶ BC on  $\Phi$ : either free-surface (see the proceeding) or rigid  $\mathbf{1}_n \cdot \nabla \Phi = 0$ .

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