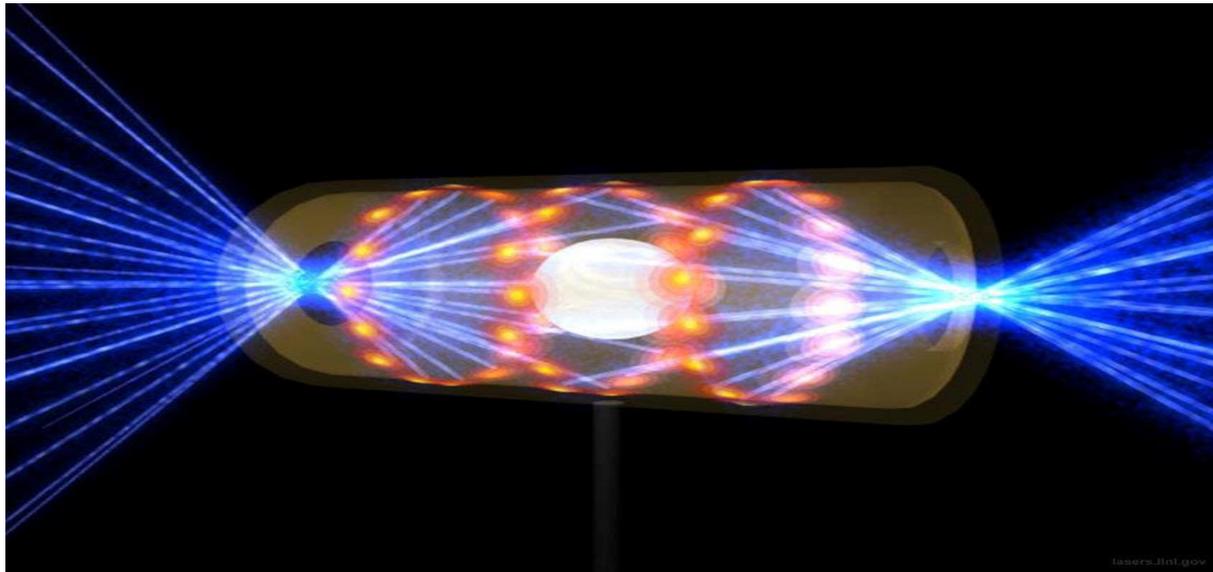


# La vie et la mort d'une onde plasma



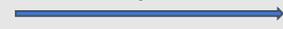
Laser incident



Laser réfléchi



Onde plasma



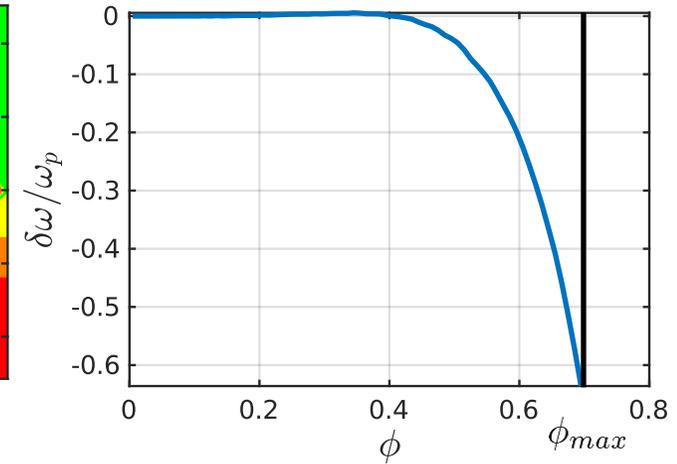
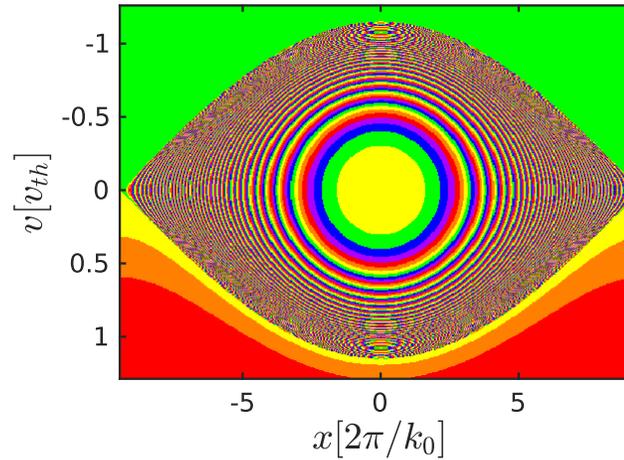
Plasma

- Le système d'équations Vlasov-Maxwell

$$\frac{\partial f}{\partial t} + v \frac{\partial f}{\partial x} - (\vec{E} + \vec{v} \times \vec{B}) \cdot \frac{\partial f}{\partial \vec{v}} = 0$$

$$\left| \begin{array}{l} \vec{\nabla} \cdot \vec{E} = 1 - \int_{\mathbb{R}^3} f d^3 \vec{v} \\ \vec{\nabla} \times \vec{B} - \frac{\partial \vec{E}}{\partial t} = - \int_{\mathbb{R}^3} \vec{v} f d^3 \vec{v} \end{array} \right| \left| \begin{array}{l} \vec{\nabla} \times \vec{E} + \frac{\partial \vec{B}}{\partial t} = \vec{0} \\ \vec{\nabla} \cdot \vec{B} = 0 \end{array} \right.$$

1D en espace  
 Adiabatique



- Le système d'équations Vlasov-Maxwell perturbé

$$\frac{\partial f_1}{\partial t} + v \frac{\partial f_1}{\partial x} - (\vec{E}_0 + \vec{v} \times \vec{B}_0) \cdot \frac{\partial f_1}{\partial \vec{v}} = (\vec{E}_1 + \vec{v} \times \vec{B}_1) \cdot \frac{\partial f_0}{\partial \vec{v}}$$

$$\left| \begin{array}{l} \vec{\nabla} \cdot \vec{E}_1 = - \int_{\mathbb{R}^3} f_1 d^3 \vec{v} \\ \vec{\nabla} \times \vec{B}_1 - \frac{\partial \vec{E}_1}{\partial t} = - \int_{\mathbb{R}^3} \vec{v} f_1 d^3 \vec{v} \end{array} \right| \left| \begin{array}{l} \vec{\nabla} \times \vec{E}_1 + \frac{\partial \vec{B}_1}{\partial t} = \vec{0} \\ \vec{\nabla} \cdot \vec{B}_1 = 0 \end{array} \right.$$

Résolution analytique et numérique

