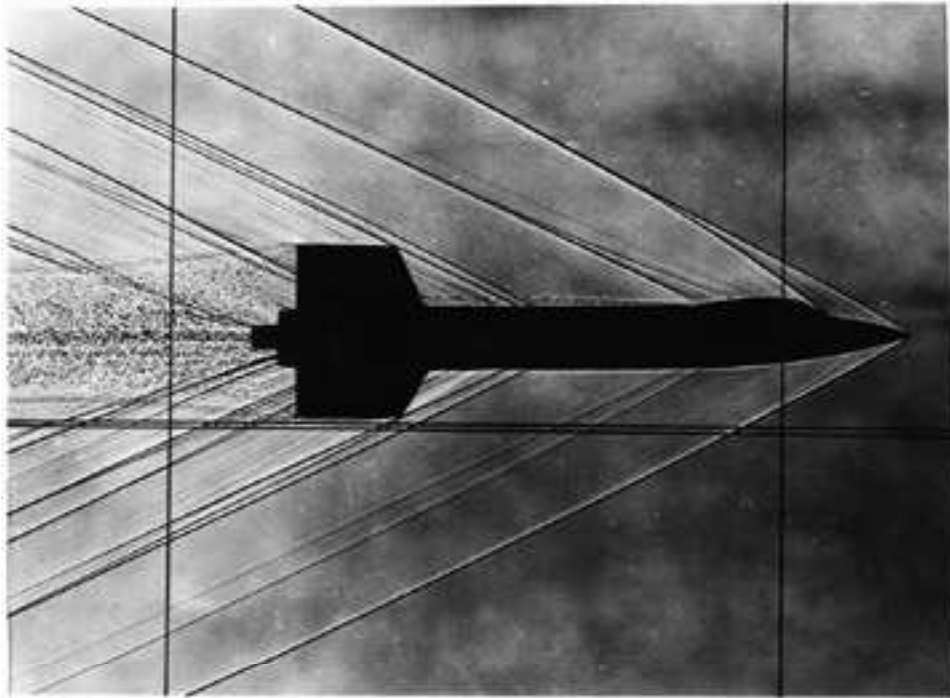
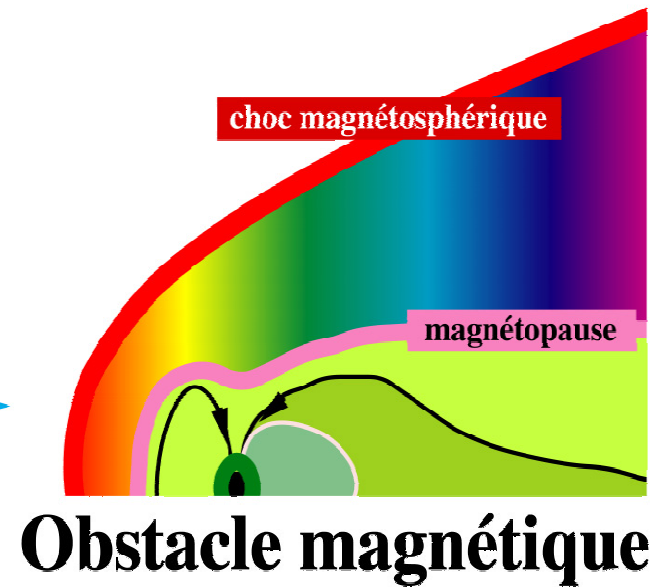


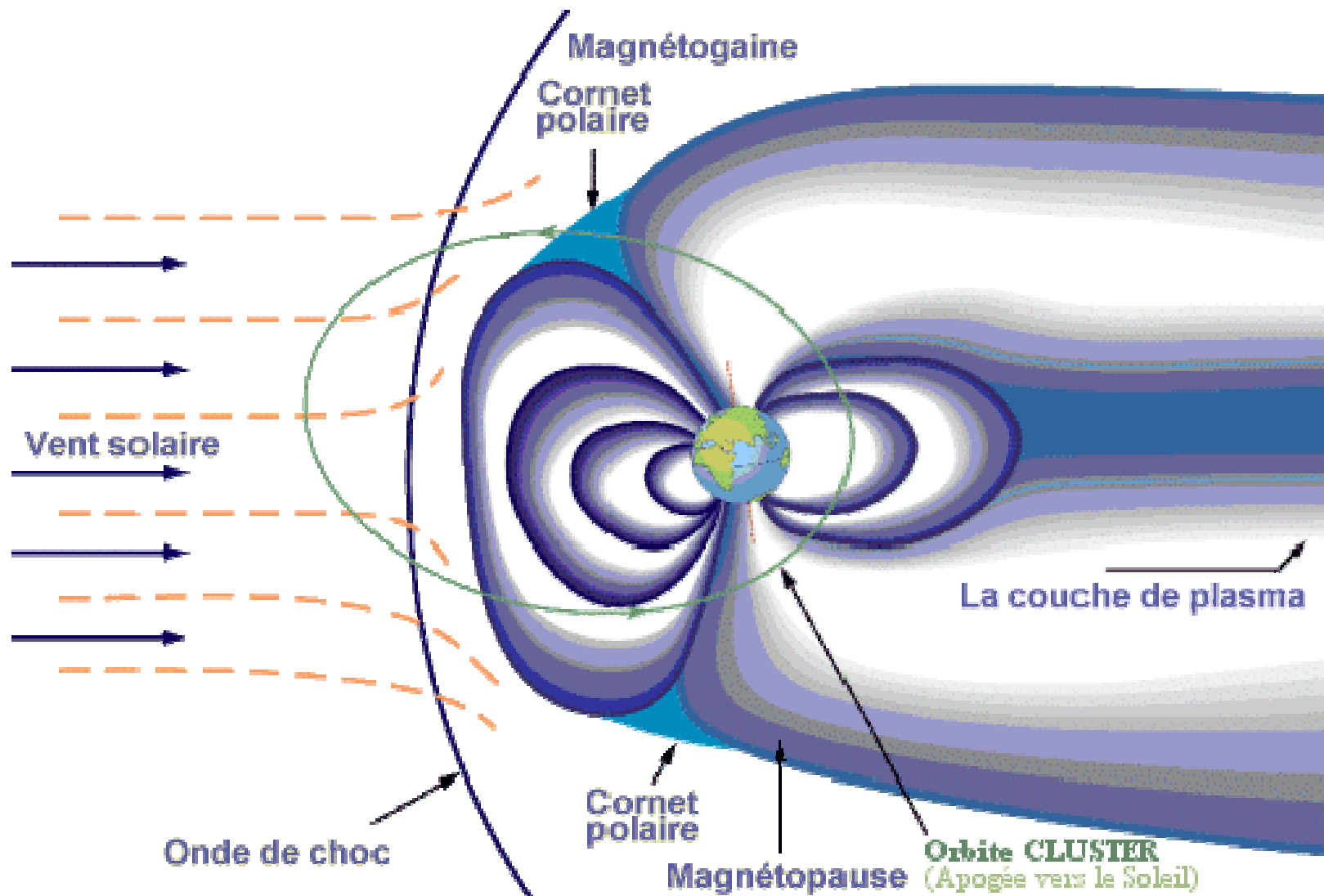
# Ondes de chocs et discontinuités



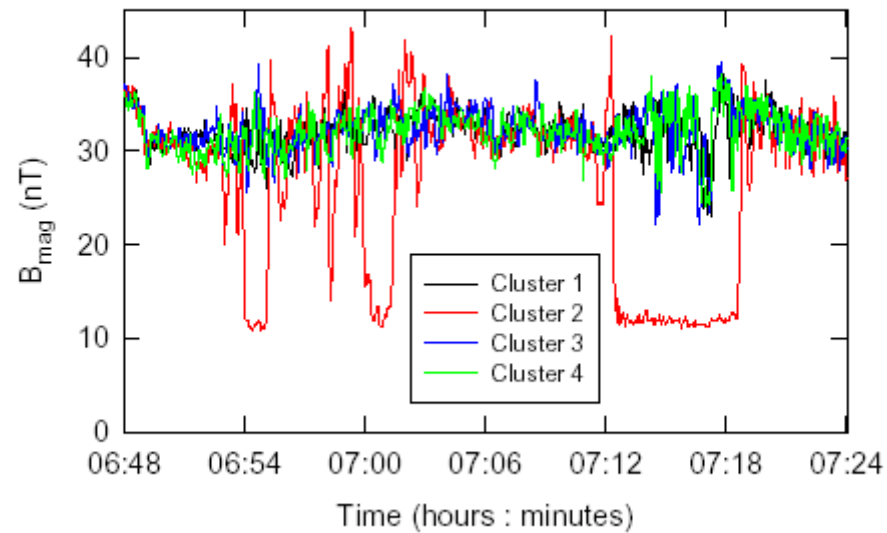
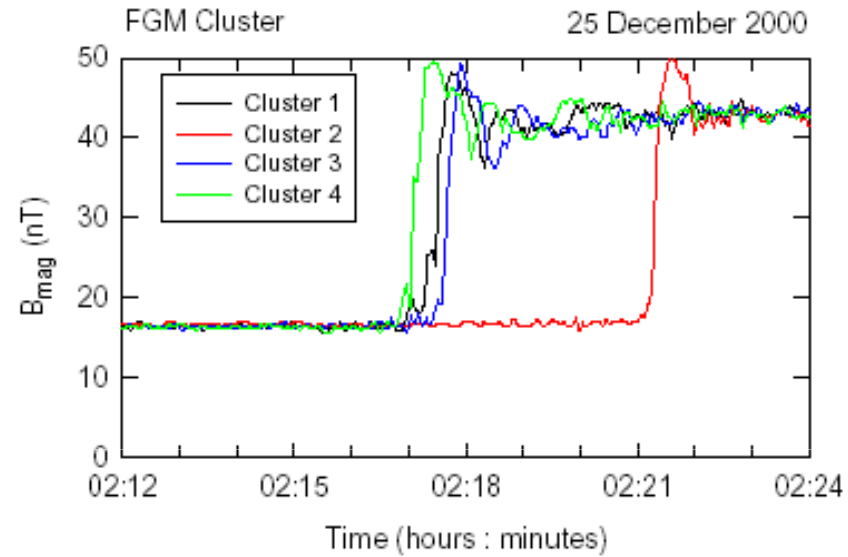
Mercure, Terre,  
Jupiter, Saturne

vent solaire  
→

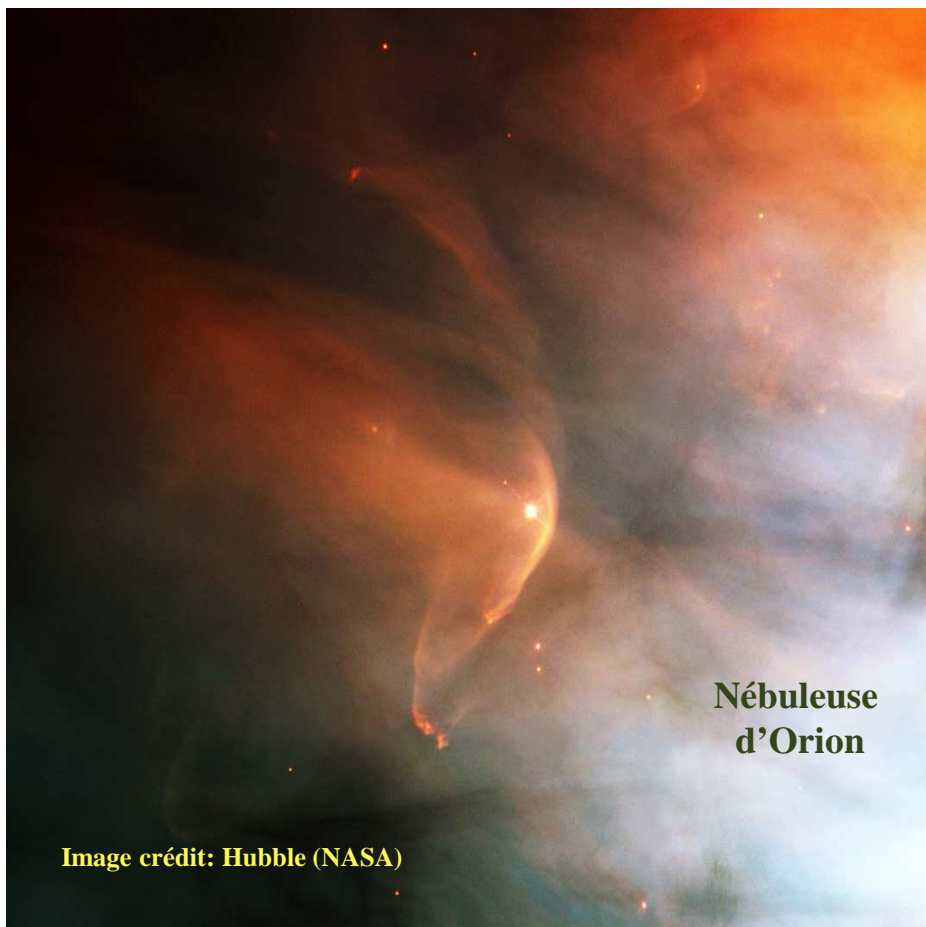




# Traversées de choc par CLUSTER



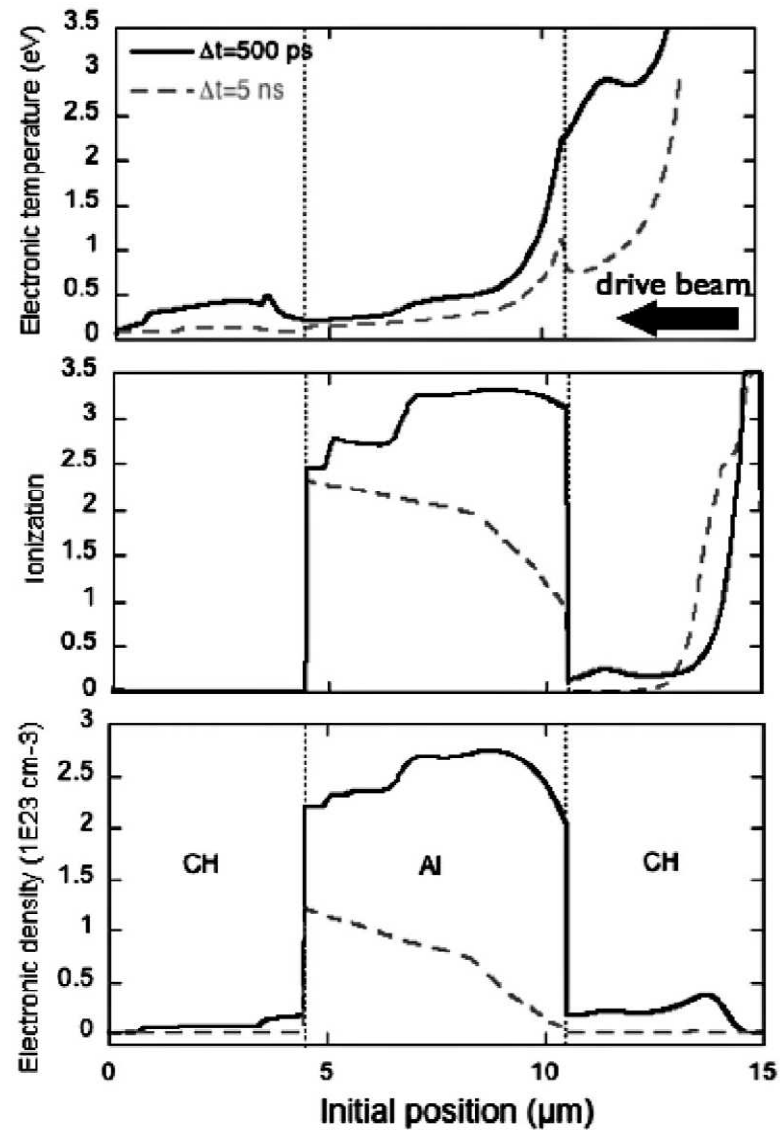
Données du magnétomètre  
FGM, (A. Balogh)



**Nébuleuse  
d'Orion**

**Image crédit: Hubble (NASA)**

# Choc provoqué par une impulsion laser sur une cible

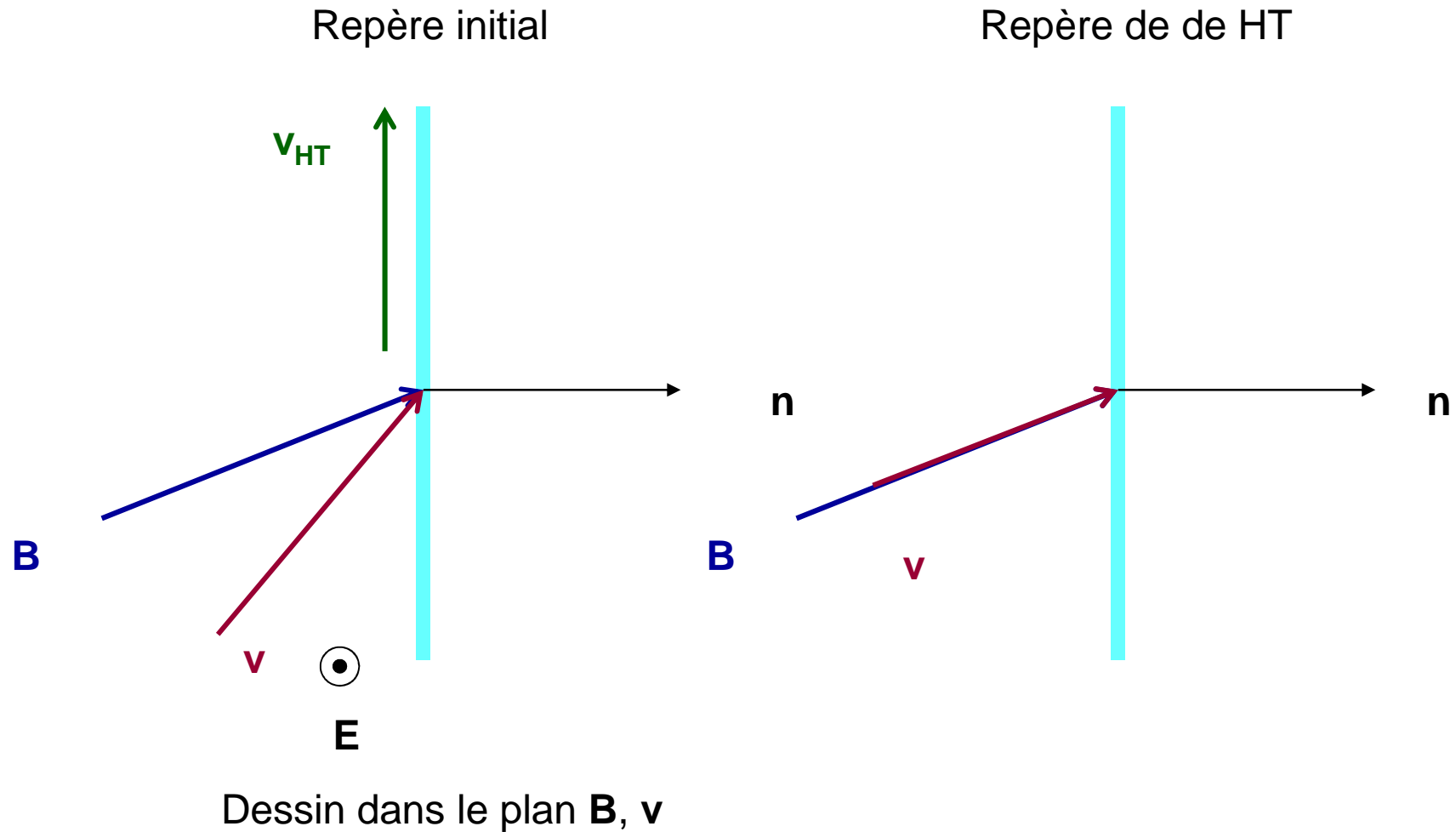


Ravasio et al, PRL, 2007

## Les équations de Rankine-Hugoniot

Divergence de $\mathbf{B}$	$B_{2n} = B_{1n} = B_n$
Conservation de la densité	$\rho_2 v_{2n} = \rho_1 v_{1n} = \Phi_m$
Conservation de l'impulsion	$\rho_2 v_{n2} \mathbf{v}_2 + \left( p_2 + \frac{B_2^2}{2\mu_0} \right) \mathbf{n} - \frac{B_n \mathbf{B}_2}{\mu_0} = \dots = \Phi_i$
Conservation de l'énergie (flux de chaleur supposé nul)	$\frac{1}{2} \rho_2 v_2^2 v_{n2} + \frac{5}{2} p_2 v_{n2} - \frac{1}{\mu_0} \left[ B_n (\mathbf{B}_2 \cdot \mathbf{v}_2) - B_2^2 v_{n2} \right] = \dots = \Phi_e$
Equation de Maxwell-Faraday	$v_{n2} \mathbf{B}_{T2} - B_{n2} \mathbf{v}_{T2} = v_{n1} \mathbf{B}_{T1} - B_{n1} \mathbf{v}_{T1} = \mathbf{n} \times \mathbf{E}_T$

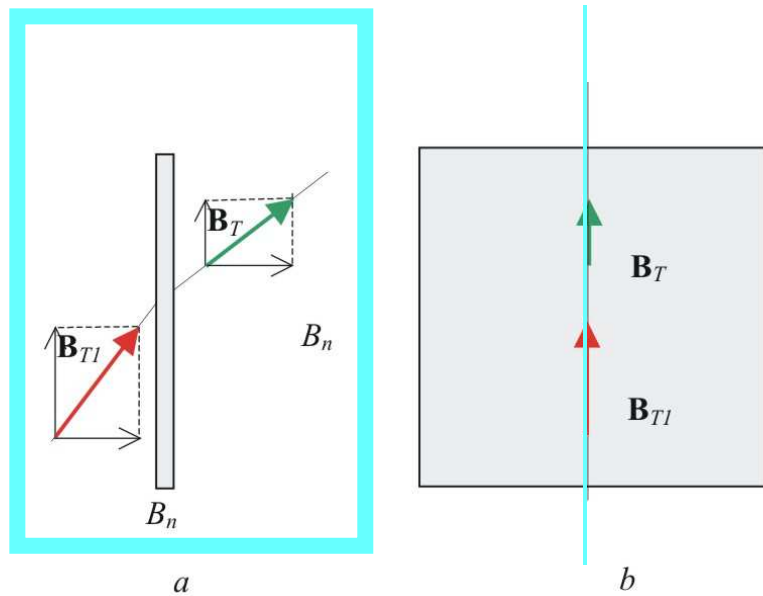
# Repère de de Hoffmann Teller





# Comportement du champ magnétique à la traversée des discontinuités

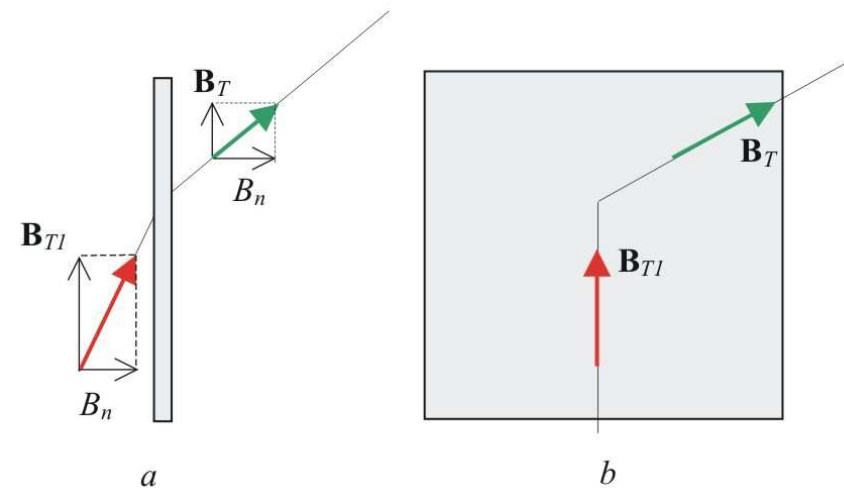
Discontinuité coplanaire



En coupe

En projection dans le plan de la discontinuité

Discontinuité non coplanaire



En coupe

En projection dans le plan de la discontinuité

