— 13 avril 2023 —

Le Soleil et ses éruptions

Manon Jarry

irap
astrophysique & planétologie

Introduction

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distance à la Terre = 150 millions de km

D = 1,4 millions de km

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x 109

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Introduction

distance à la Terre = 150 millions de km

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x 109

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Oui mais.. c'est quoi le Soleil ?

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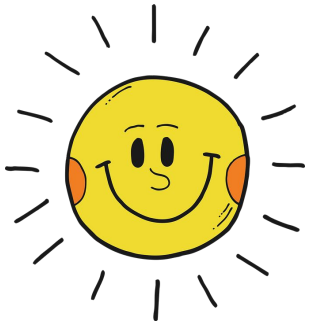
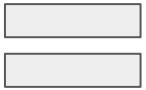
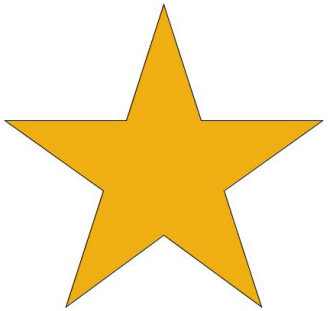
Le Soleil







Le Soleil est une étoile

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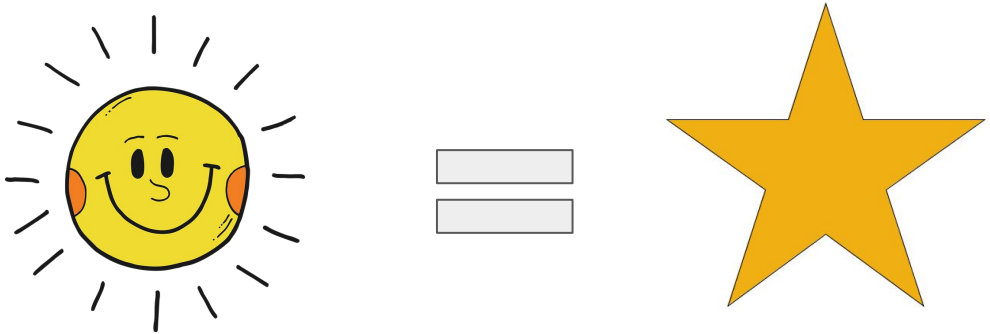
Le Soleil

Q : Quel âge a le Soleil ?



Le Soleil est une étoile

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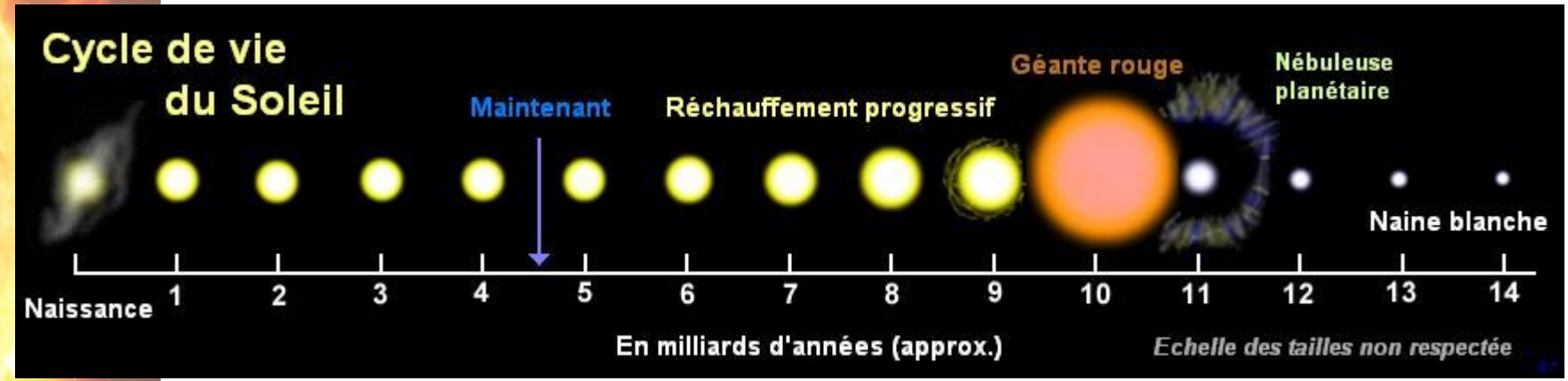

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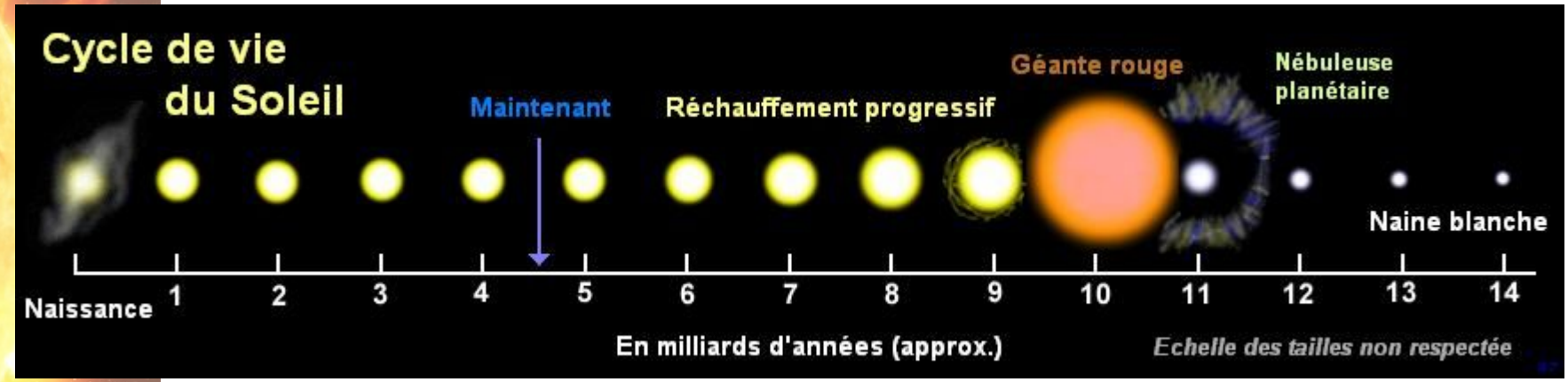
Le Soleil

Q : C'est quoi une étoile ?



Le Plasma

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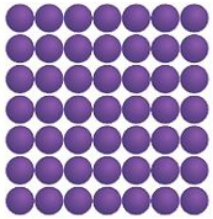
Le Plasma



Solide

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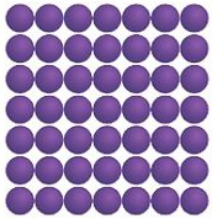
Le Plasma

États physiques

Augmentation de l'énergie



Solide

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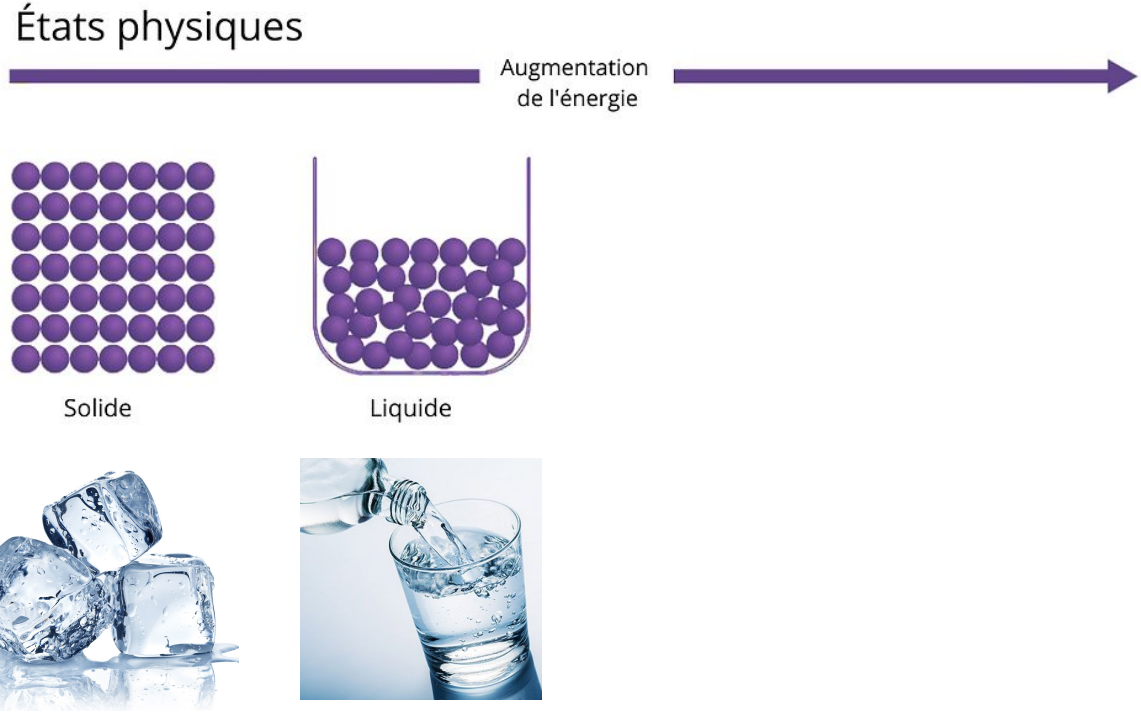
Le Plasma



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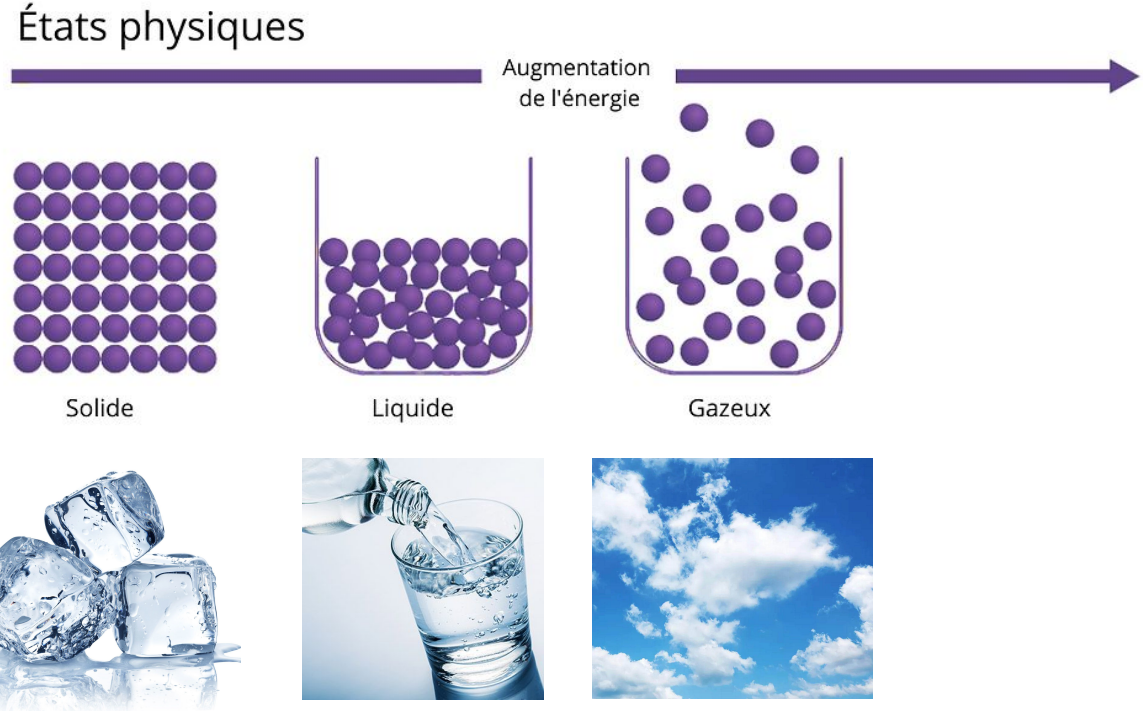
Le Plasma



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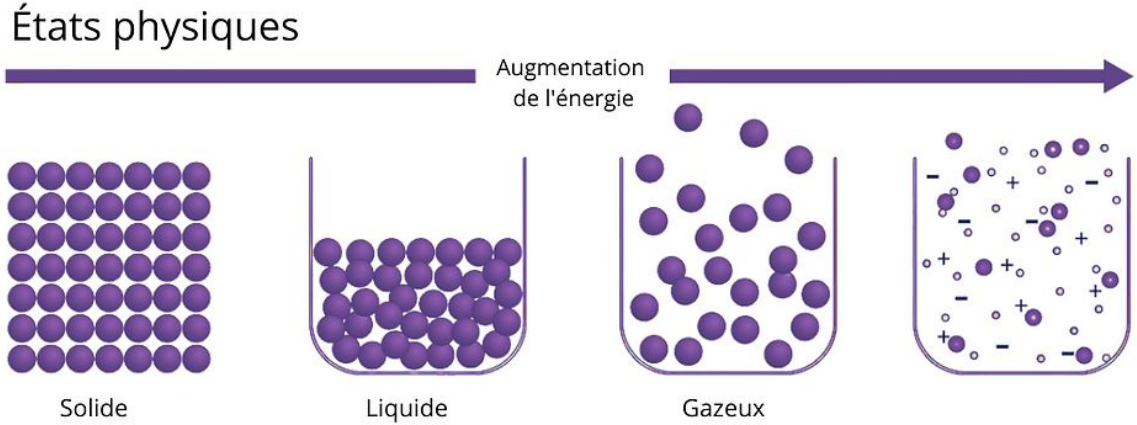
Le Plasma



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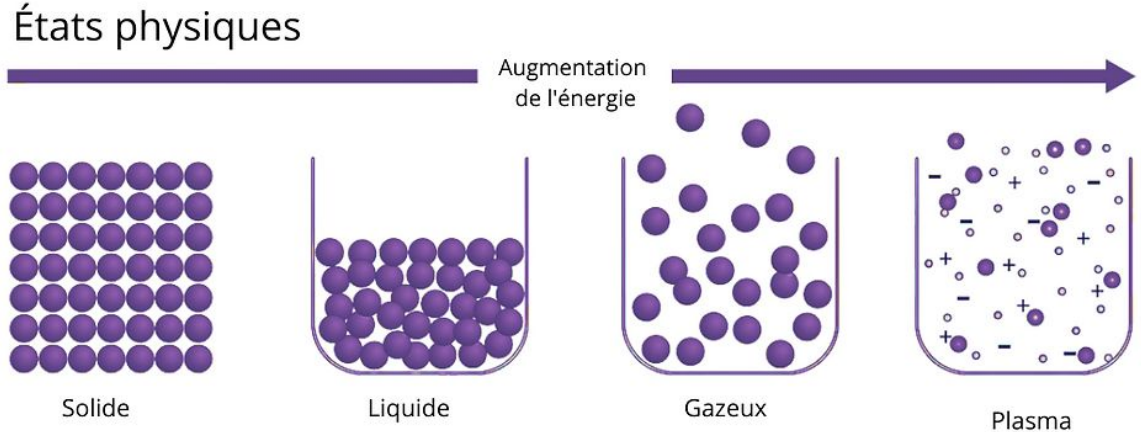
Le Plasma



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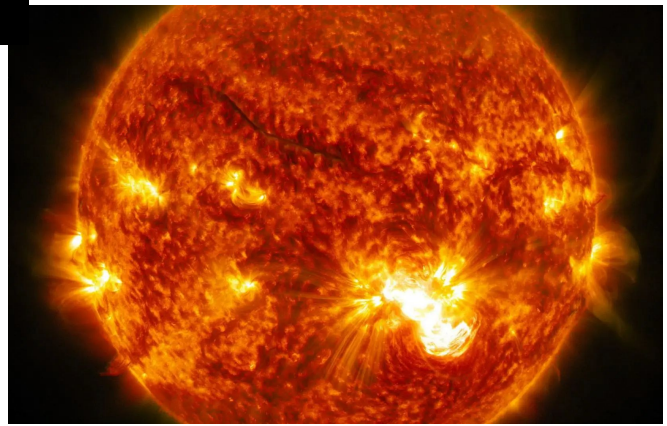
Le Plasma



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Le Soleil

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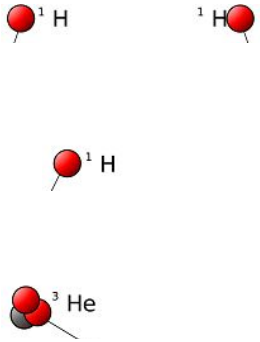
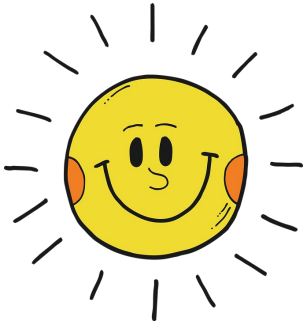
Le Soleil





74% d'hydrogène
25% d'hélium
1% d'autres éléments

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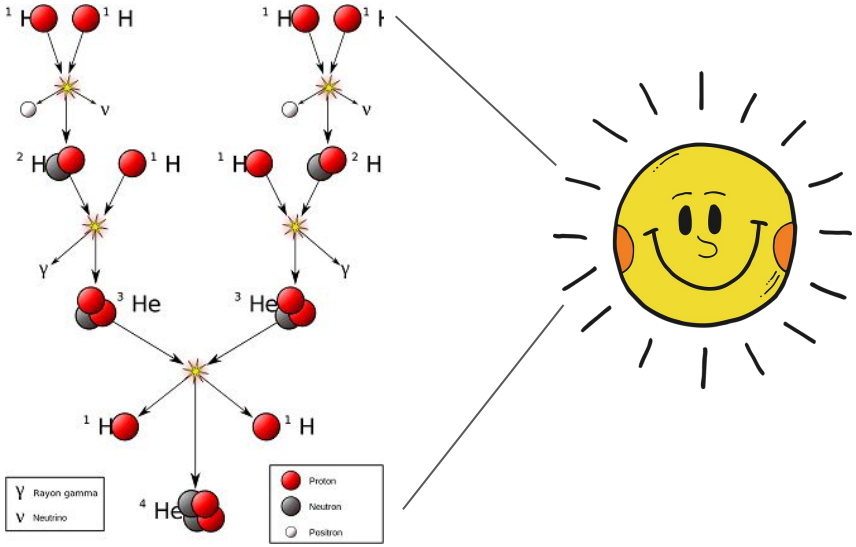
Le Soleil



Réactions thermonucléaires

74% d'hydrogène
25% d'hélium
1% d'autres éléments

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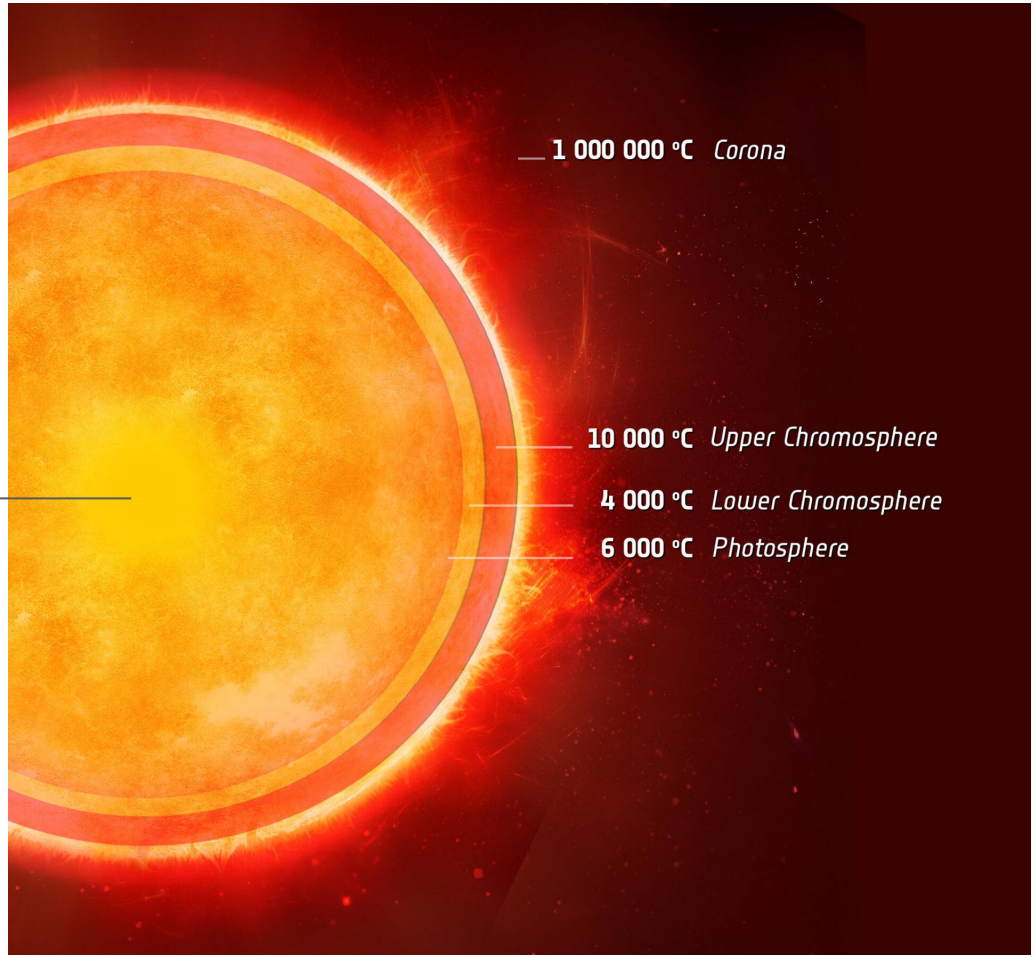
Le Soleil

coeur = 15 millions °C



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Le Soleil

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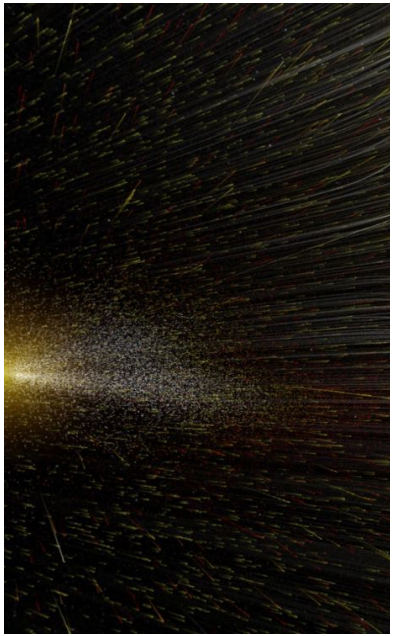

particules = vent solaire

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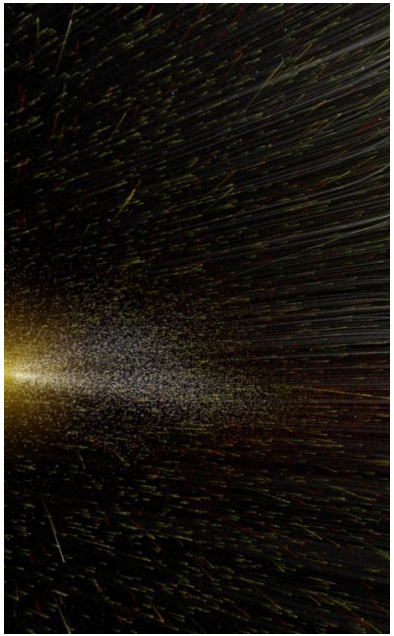

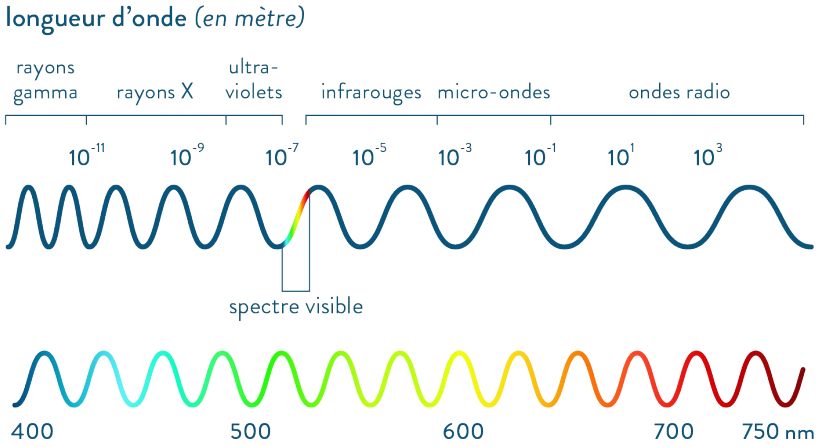

particules = vent solaire

et des photons (= "lumière")

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Le Soleil

Récapitulons !

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Le Soleil

Une étoile est :

- une grosse boule de plasma (d'hydrogène et d'hélium)

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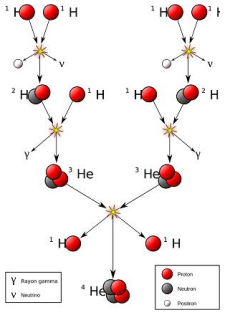
Une étoile est :

- une grosse boule de plasma (d'hydrogène et d'hélium)
- où a lieu des réactions thermonucléaires



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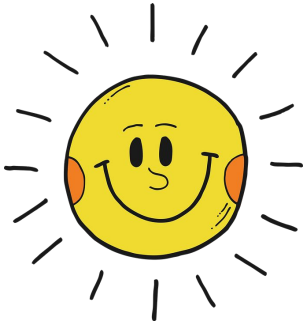
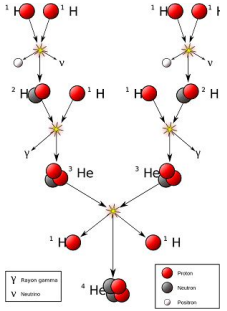
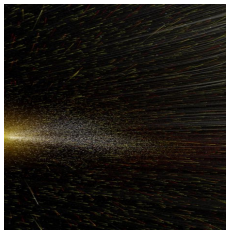
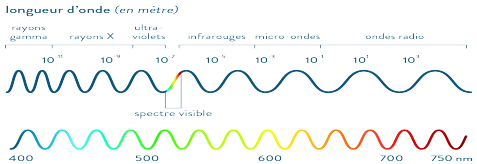


Une étoile est :

- une grosse boule de plasma (d'hydrogène et d'hélium)
- où a lieu des réactions thermonucléaires
- qui libère donc des particules et des photons







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Le Soleil

le champ magnétique

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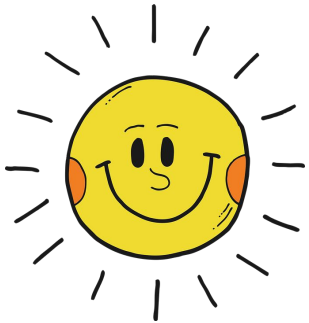
Le Soleil

le champ magnétique



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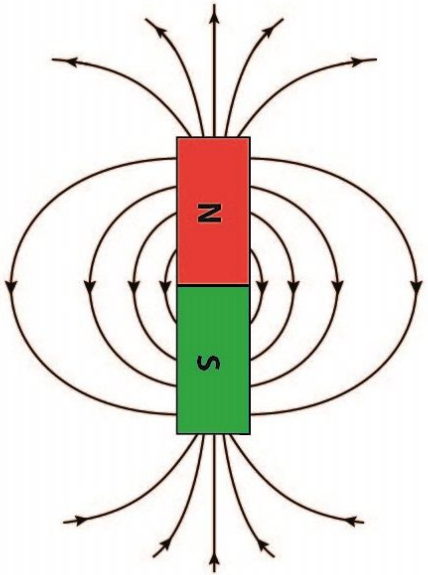

Le Soleil possède un champ magnétique

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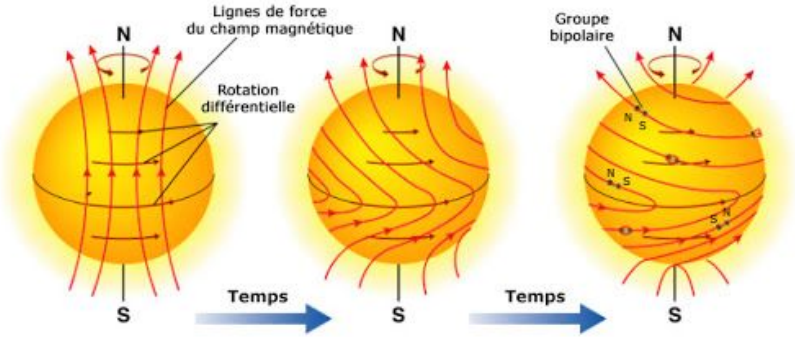
Le Soleil

le champ magnétique

Terre = solide → rotation classique
Soleil = gaz → rotation différentielle



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Le Soleil

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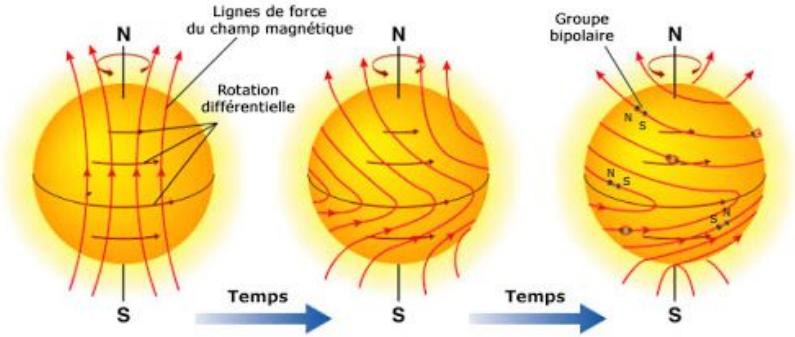

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Le Soleil

le champ magnétique

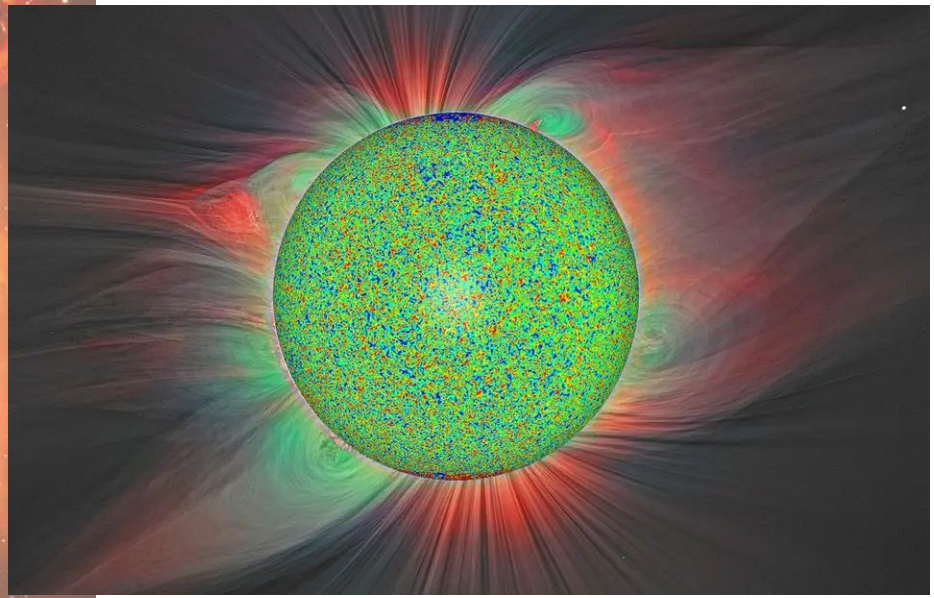

image des pôles et des lignes de champ

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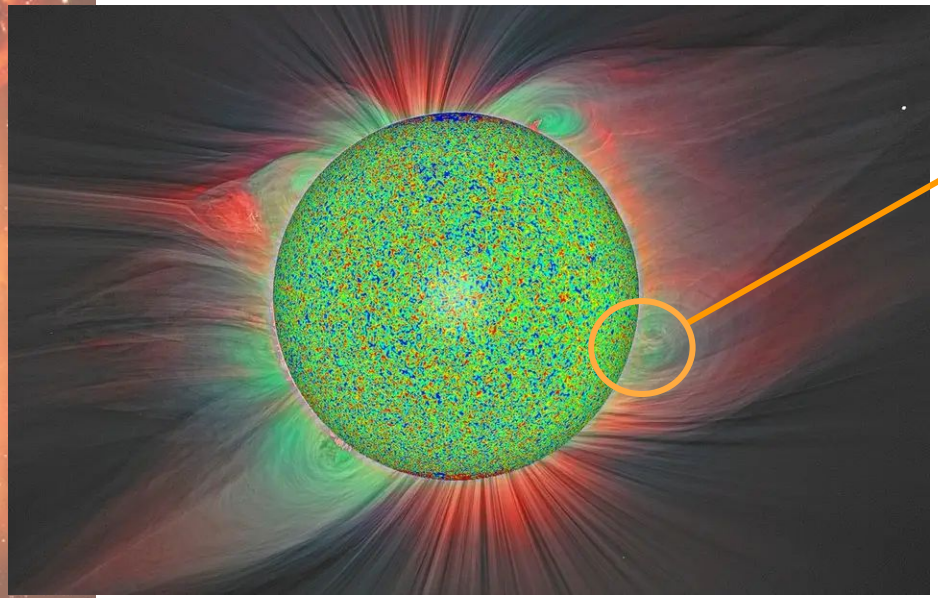
Le Soleil

le champ magnétique



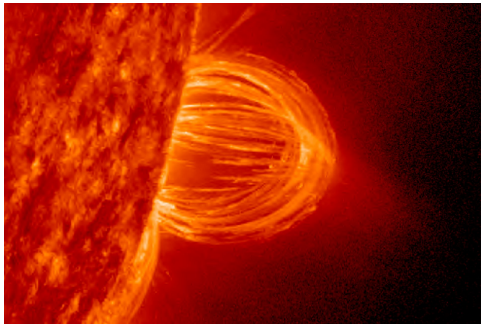


image des pôles et des lignes de champ

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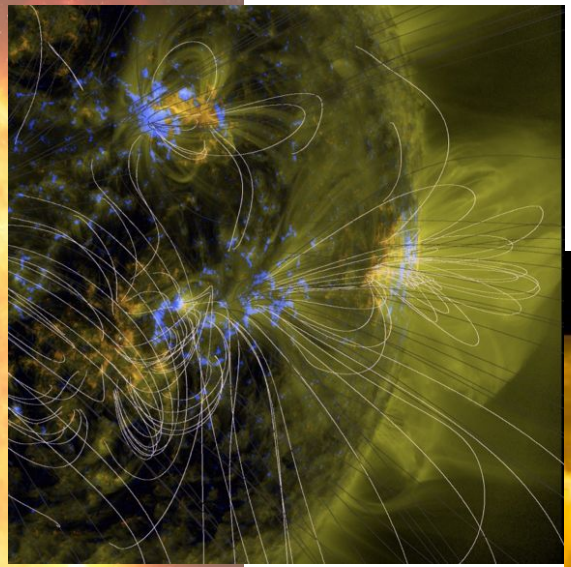
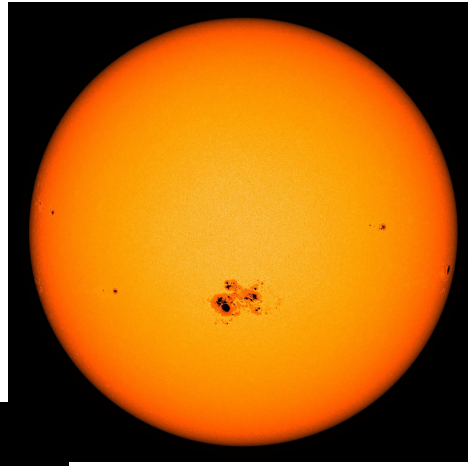
Le Soleil

les tâches solaires





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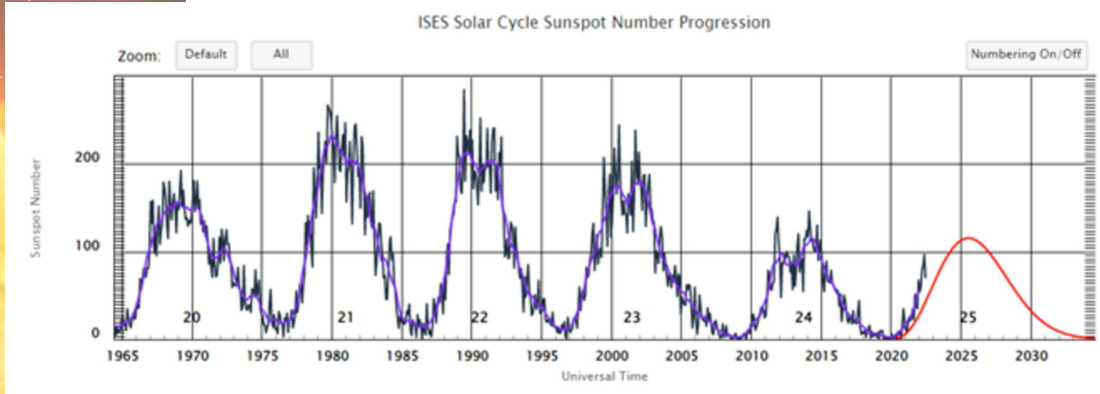
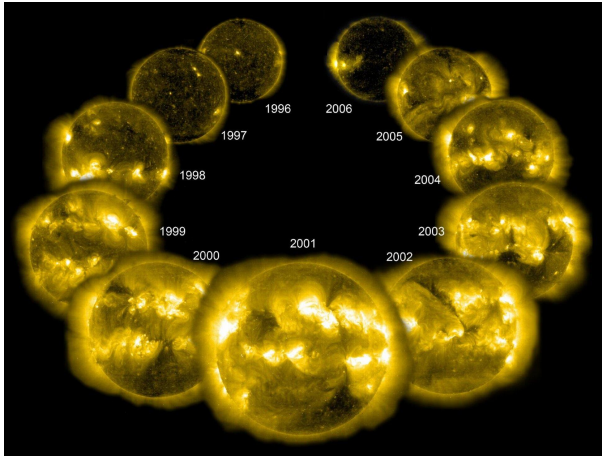
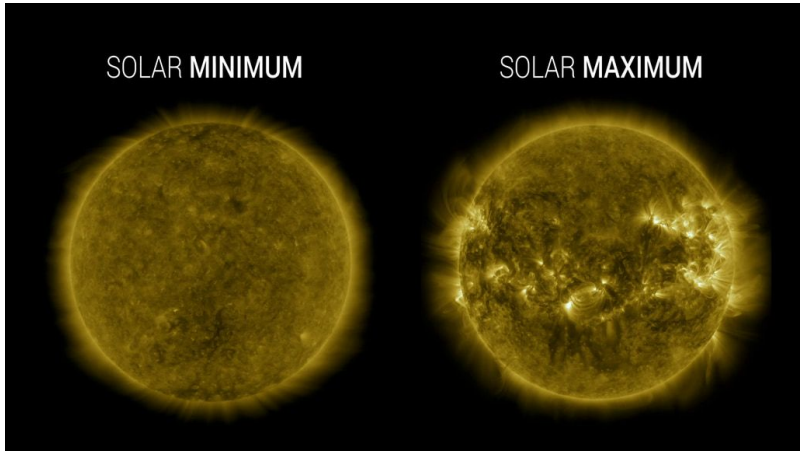
Le Soleil

le cycle solaire







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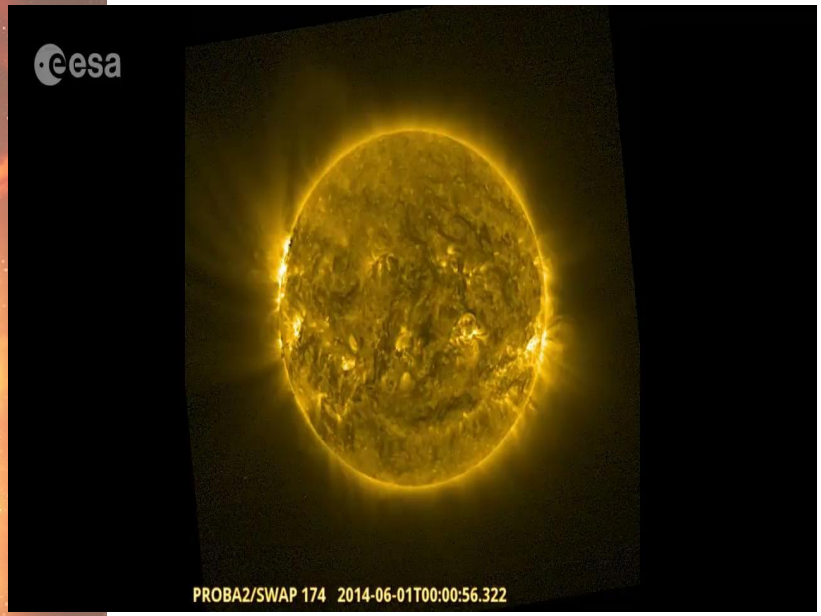
Le Soleil

activité solaire



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Le Soleil

déclenchement d'une éruption

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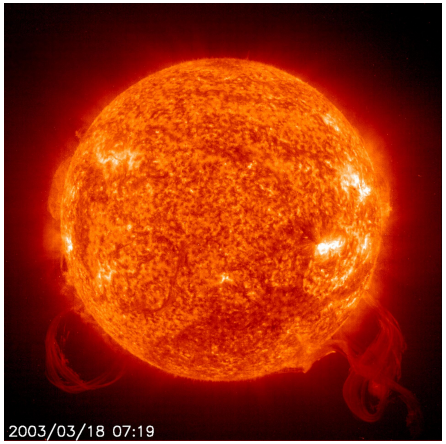
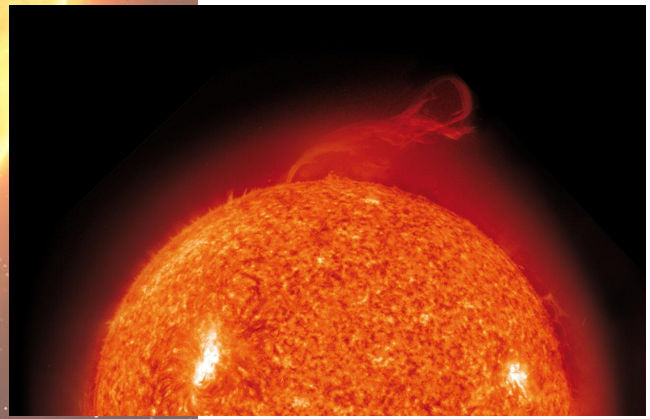
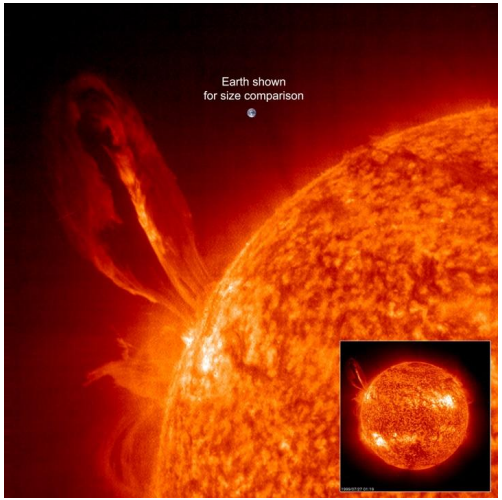
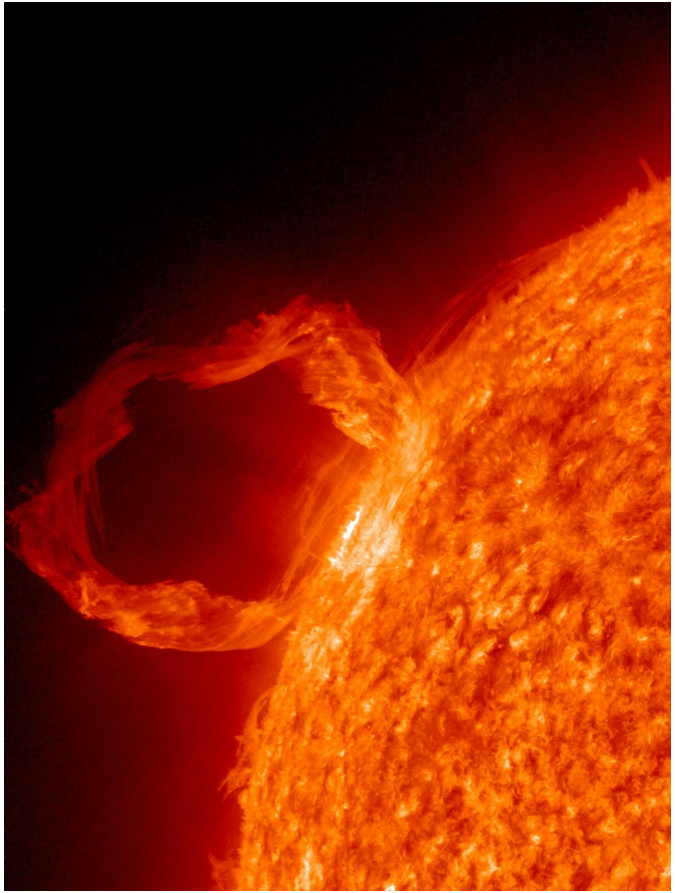
Le Soleil

déclenchement d'une éruption









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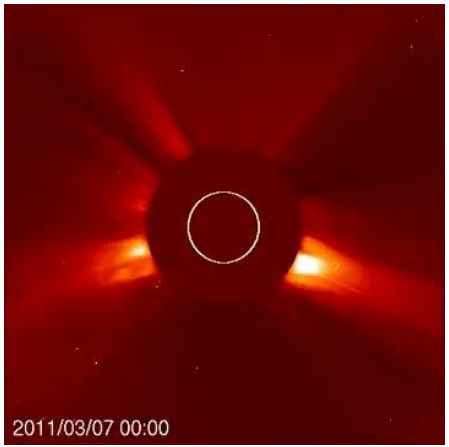
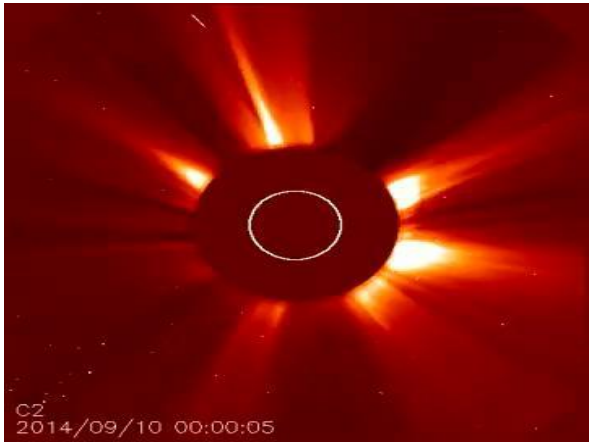
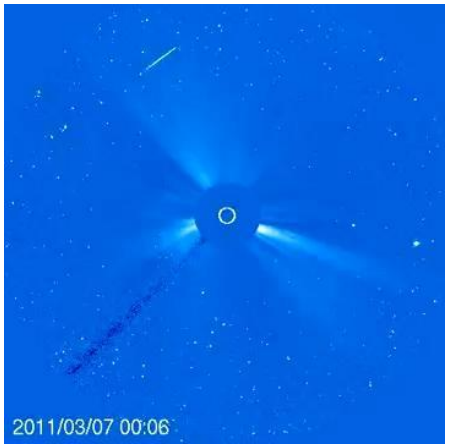
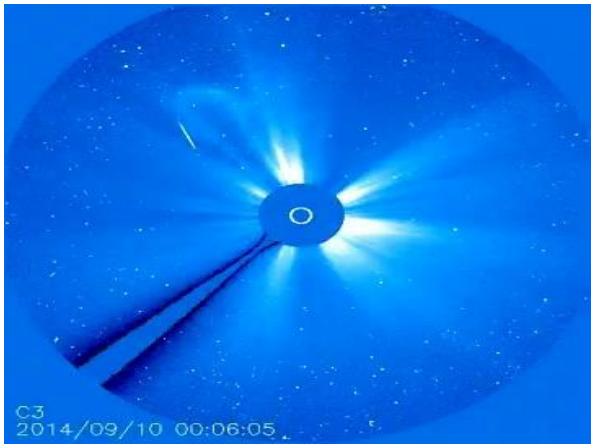
Le Soleil

déclenchement d'une éruption



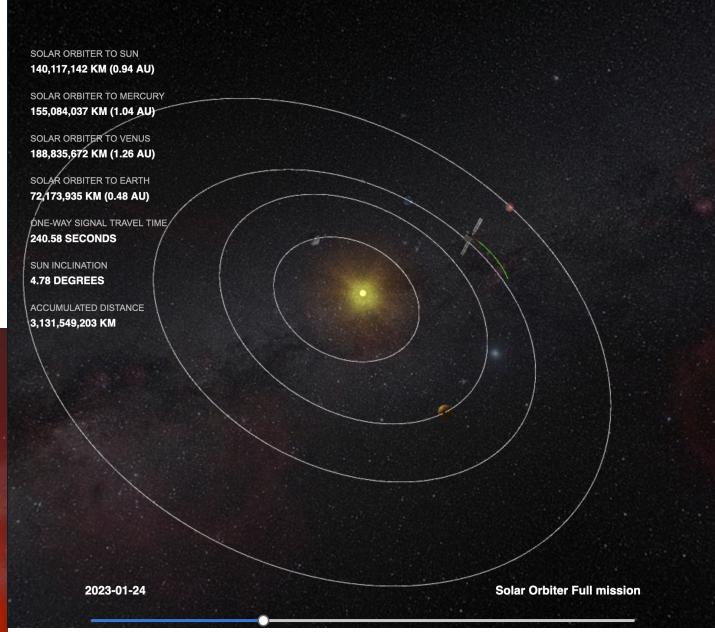






L'éruption solaire

Solar orbiter



Where is Solar Orbiter ?

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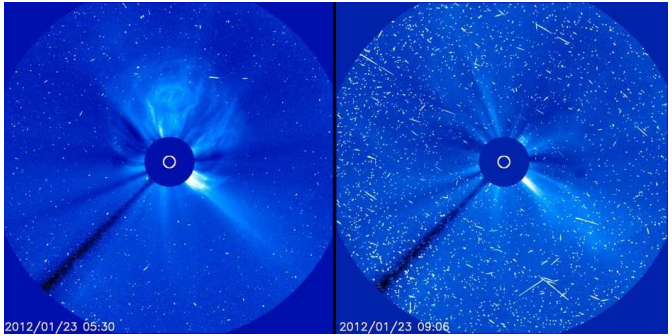
L'éruption solaire

observations



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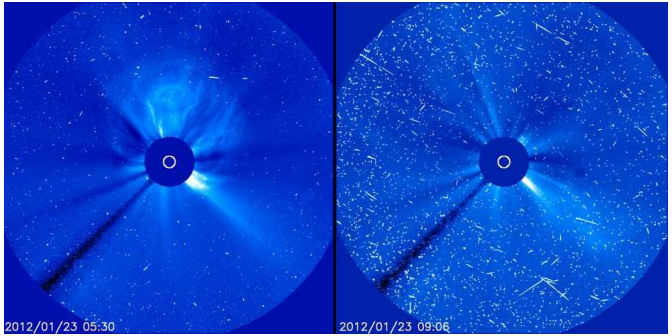
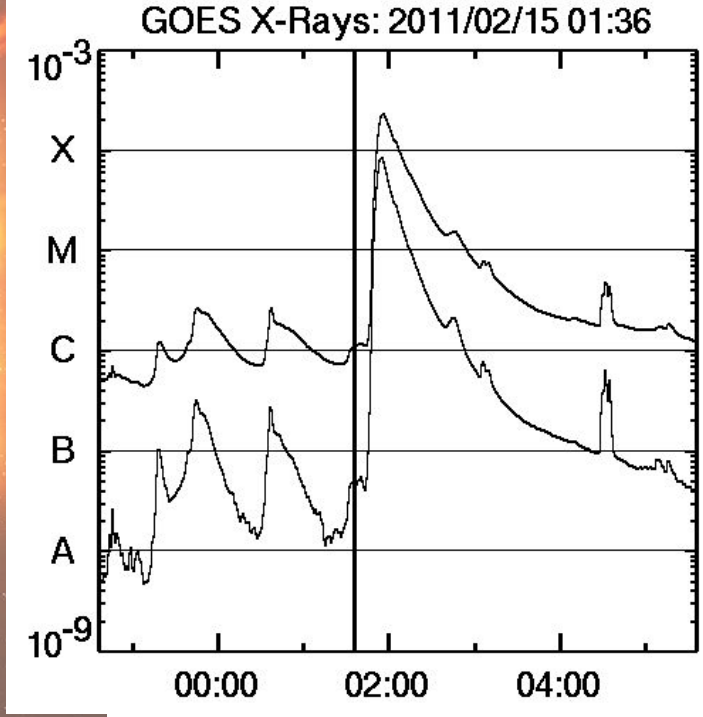
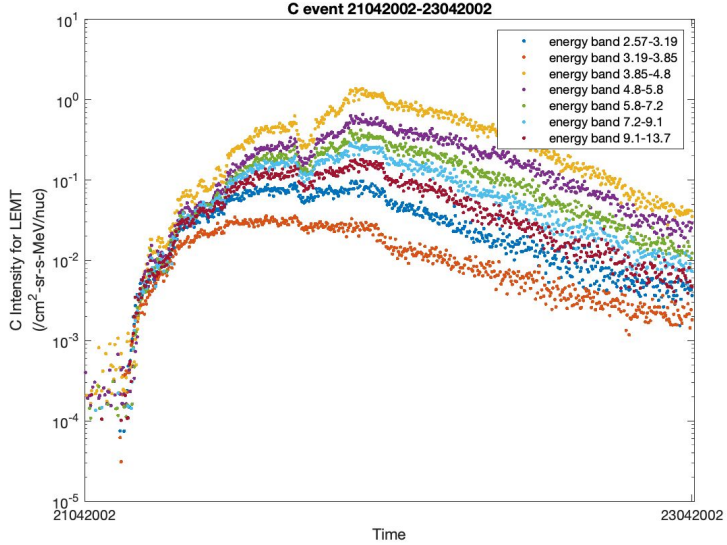
L'éruption solaire

observations







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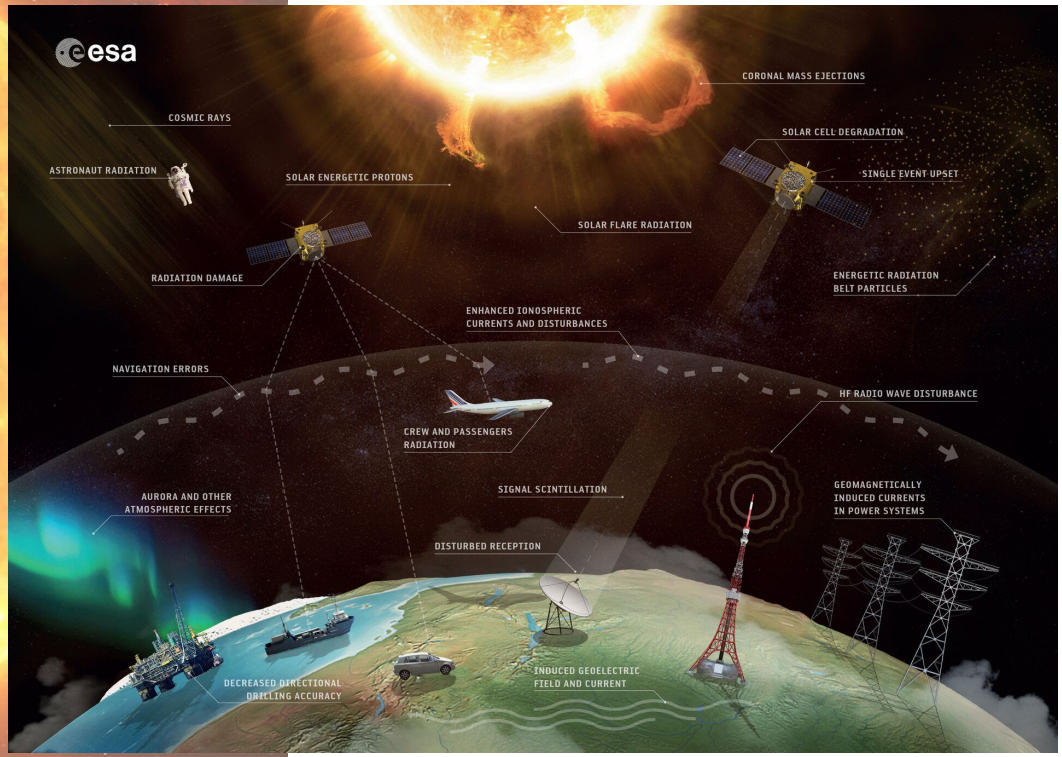
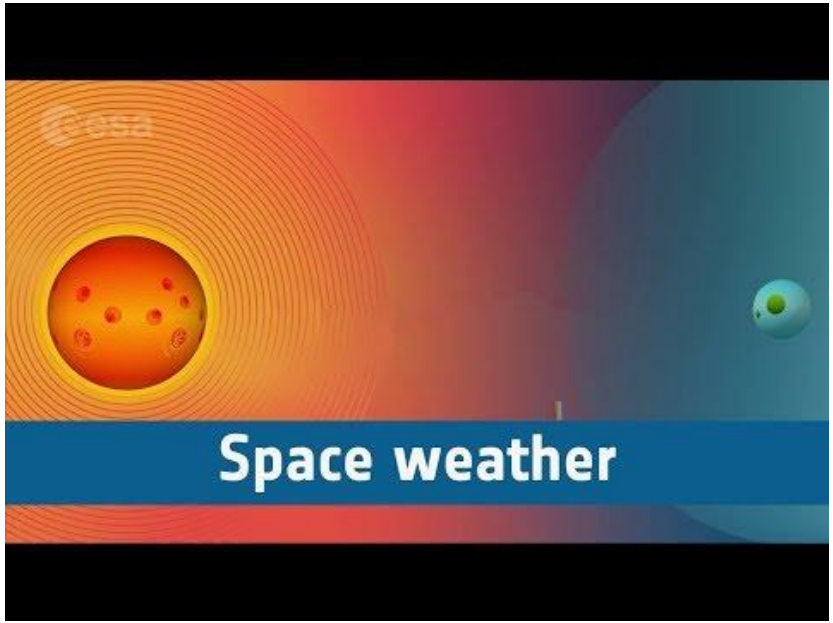
L'éruption solaire

La météo spatiale





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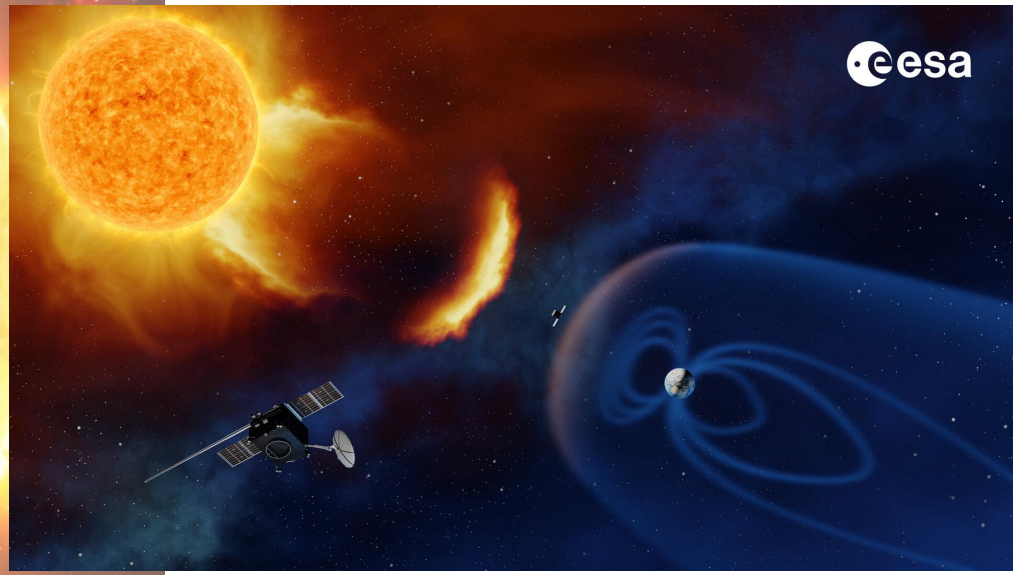
L'éruption solaire

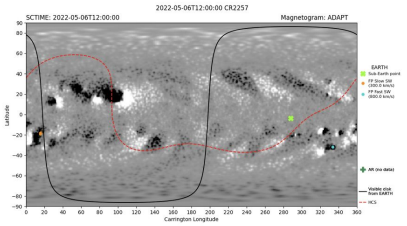
Prédictions



Shock-Tool

EARTH PSP STEREO A SOLAR ORBITER BEPI COLOMBO

ADAPT



Mode : FORECAST

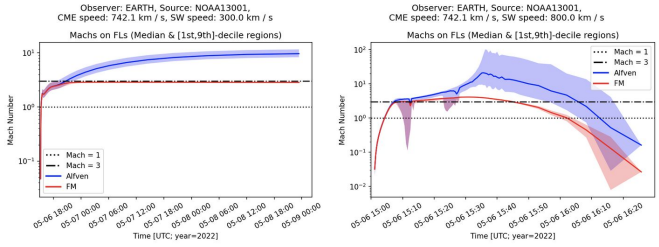
Coronal Model : PFSS (rss = 3.0 Rsun)

Magnetogram : ADAPT-5 (2022-05-06 12:00:00 UTC)

Reliability Test (WL) : 45.94%

▸ Download Data Download image

SHOCK-TOOL



NOAA13001 NOAA13004

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Les aurores

Manon Jarry

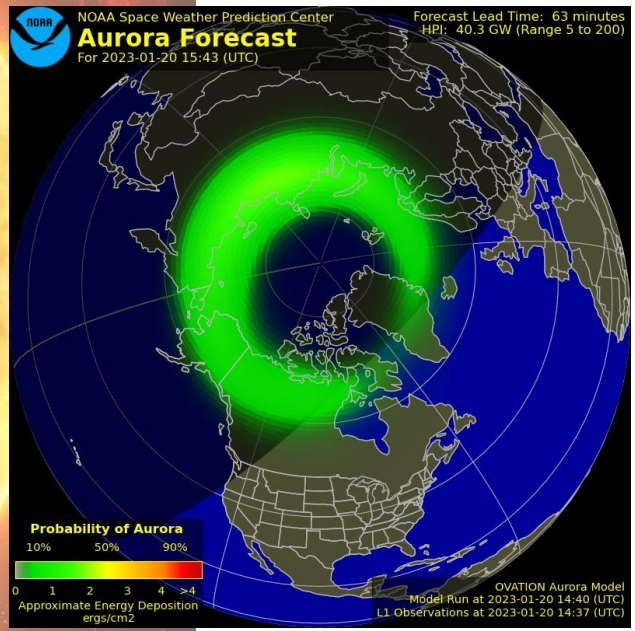
Les aurores .. boréales

Les aurores .. australes

Manon Jarry

Les aurores

leur formation



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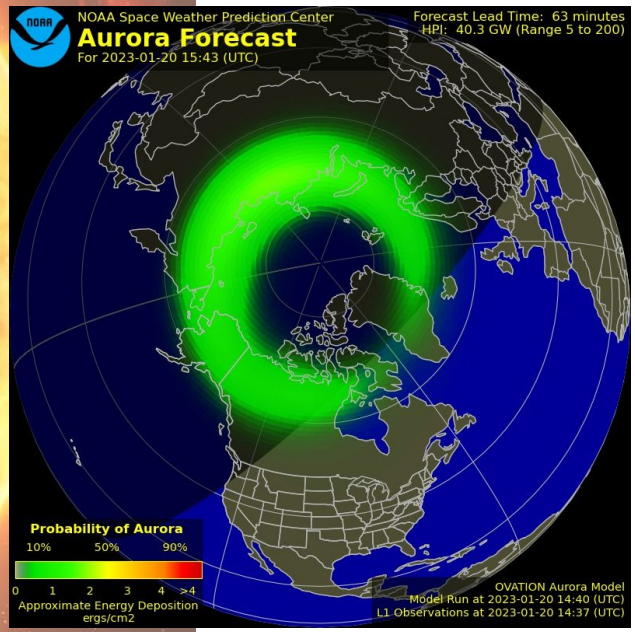
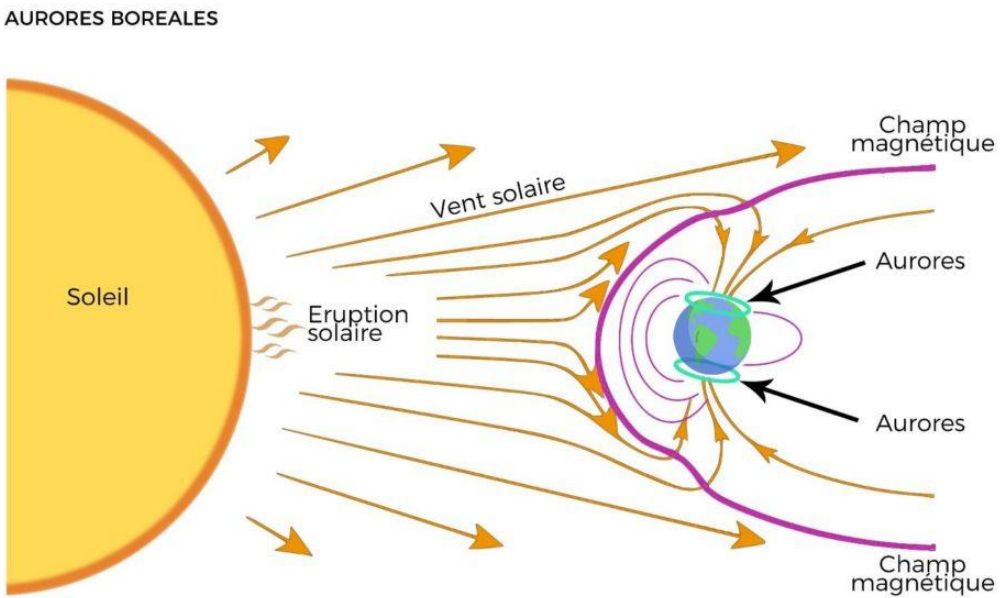
Les aurores

leur formation





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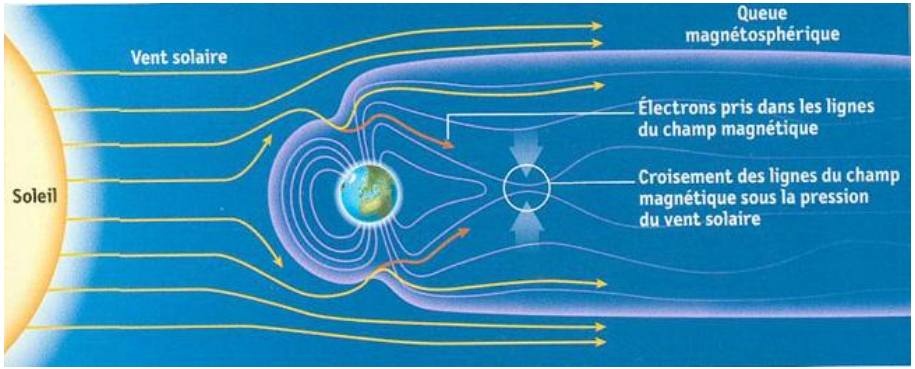
Les aurores leur formation

1



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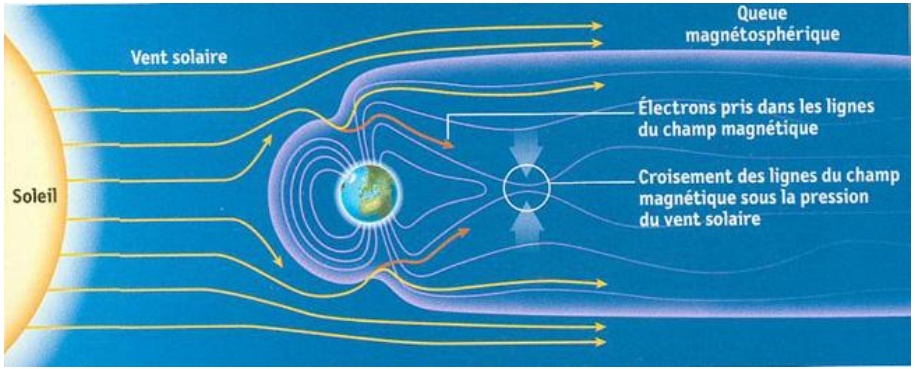
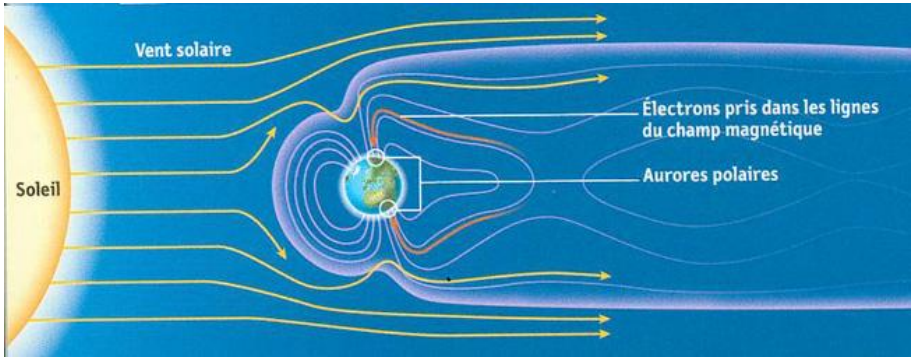
Les aurores leur formation

1



2



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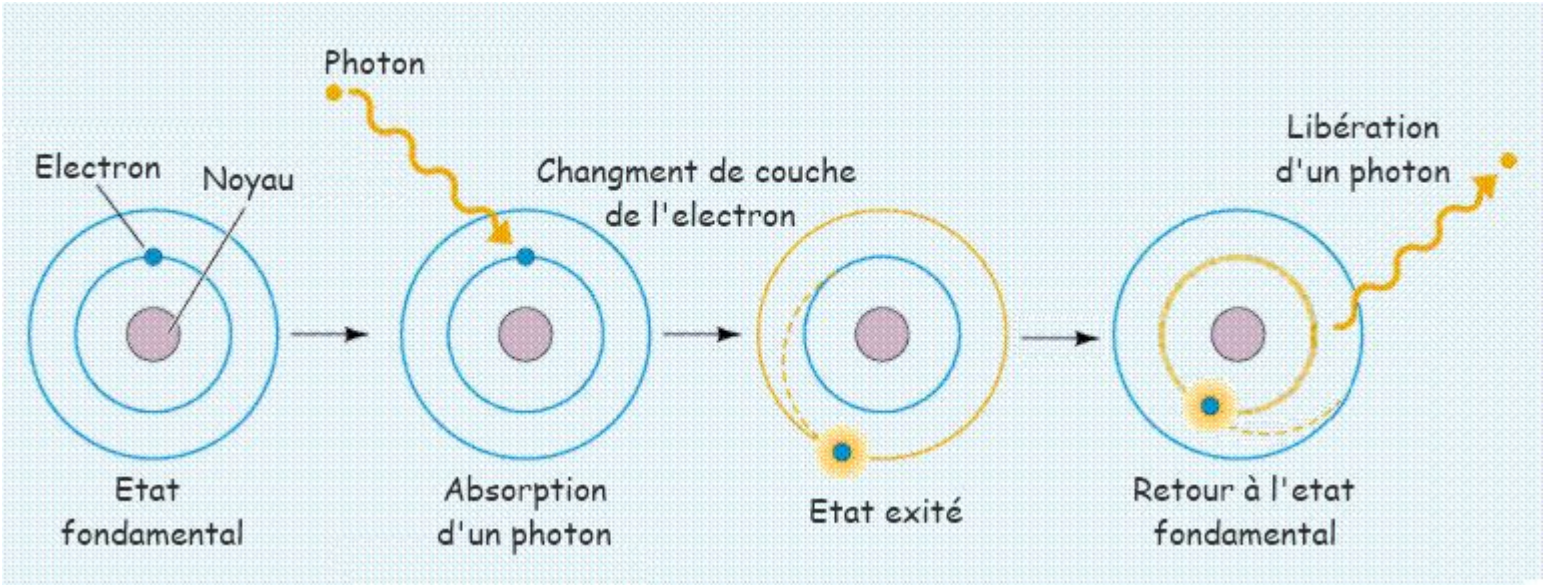
Les aurores leur formation



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Les aurores sur d'autres planètes

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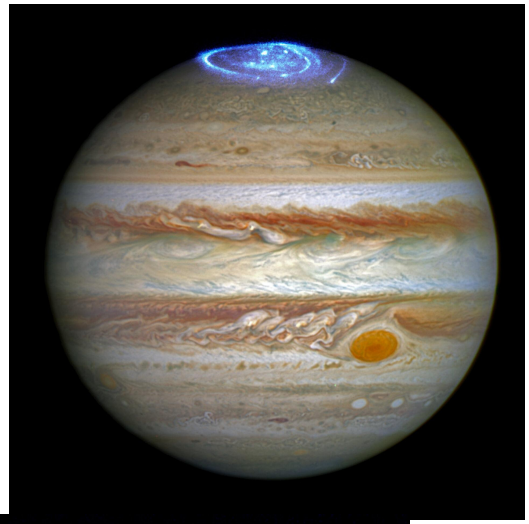
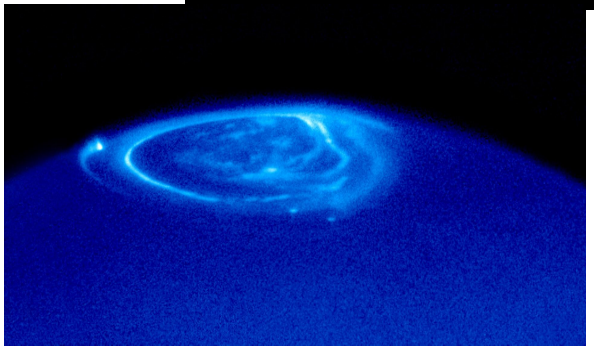
Les aurores sur d'autres planètes



Jupiter



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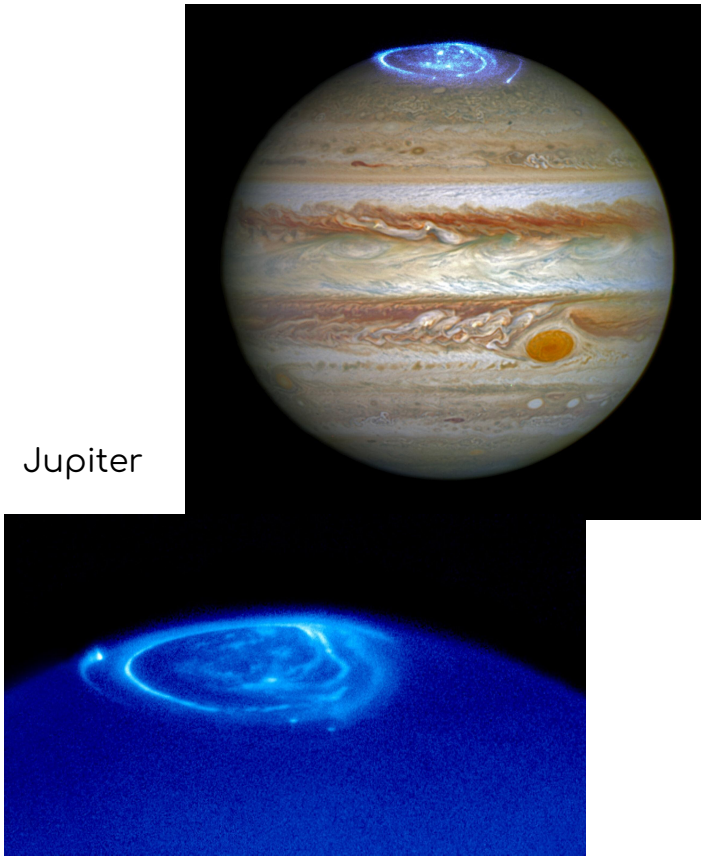
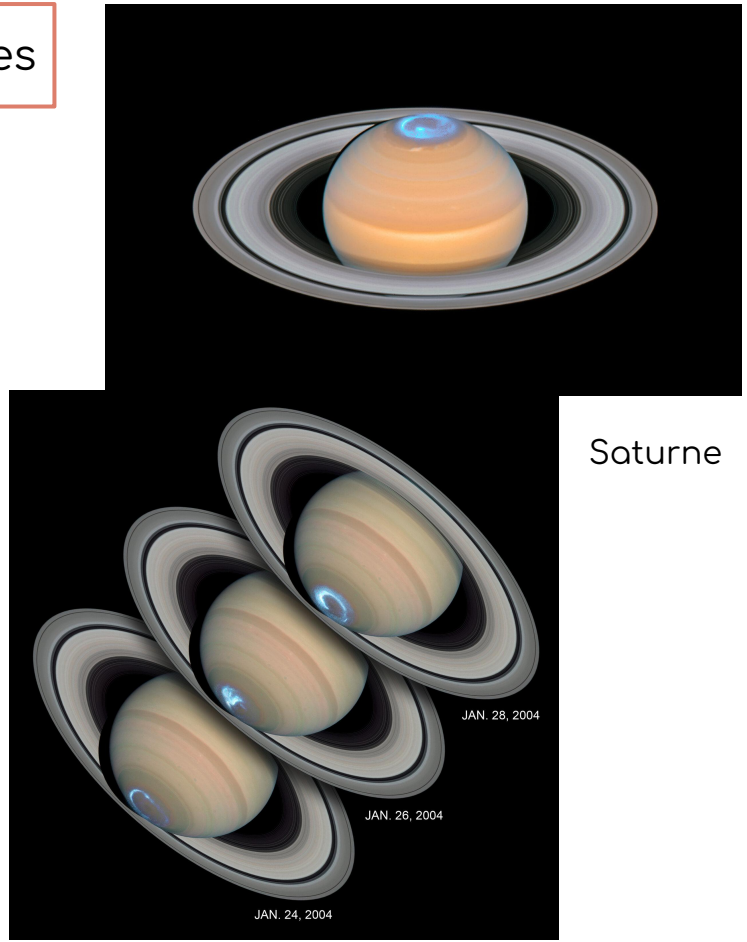
Les aurores sur d'autres planètes



Jupiter



Saturne

Manon Jarry

— 13 avril 2023 —

Merci !

irap
astrophysique & planétologie

Idées de sujets pour le grand oral

Physique-chimie :

- Quel est le lien entre les éruptions solaires et les aurores boréales ?
- Comment se forme une aurore boréale dans l'atmosphère ?
- La fusion nucléaire est-elle une source d'énergie d'avenir ?
- Comment fonctionne un GPS ?
- Comment communiquer dans l'espace ?

SI :

- Quel avenir pour les déchets spatiaux ?
- Les éruptions solaires constituent-elles un risque pour les satellites artificiels ?

SVT :

- La vie pourrait-elle provenir de l'espace ?
- Le risque de développer un cancer est-il plus élevé dans l'espace ?

Idées de sujets pour le grand oral

SES :

- L'investissement d'un pays dans le domaine spatial est-il un indice de son développement ?
- Le tourisme spatial est-il l'avenir de nos vacances ?

HGGSP :

- Les nouvelles formes de guerres se jouent t-elles déjà dans l'espace ?

LLCA :

- L'histoire de l'astronomie a-t-elle démarré en Antiquité ?