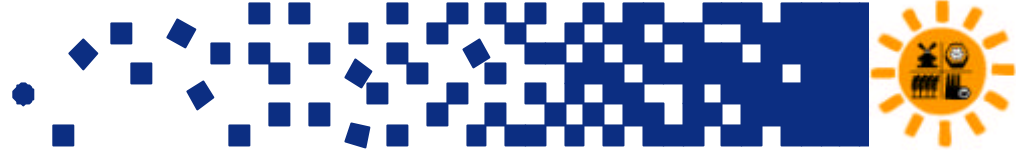




KTH 175 ÅR 2002



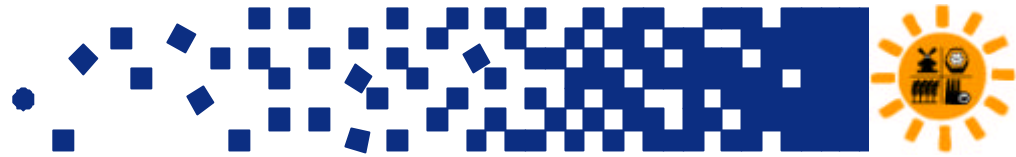
# Alfvénlaboratoriet

## Fusionsplasmafysik

James R. Drake

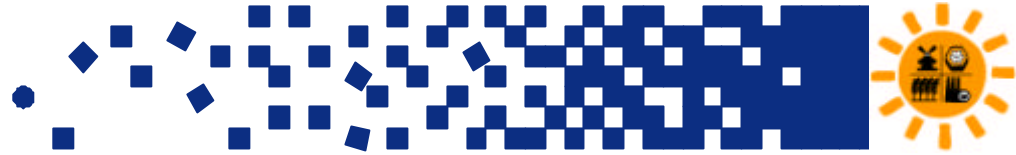


KTH 175 ÅR 2002

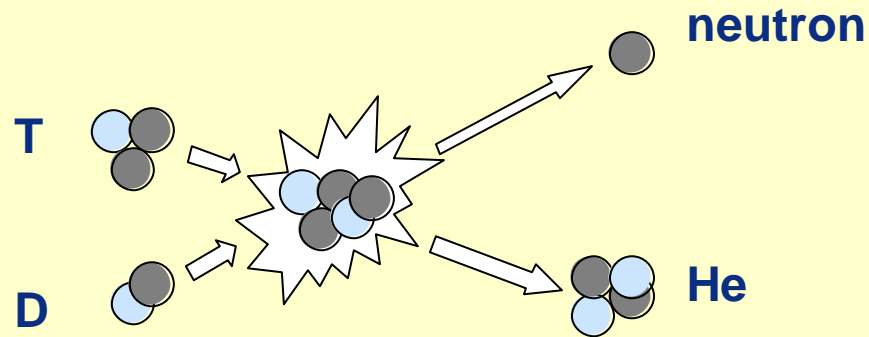


$$E = mc^2$$

*Einstein*



$$E=mc^2$$

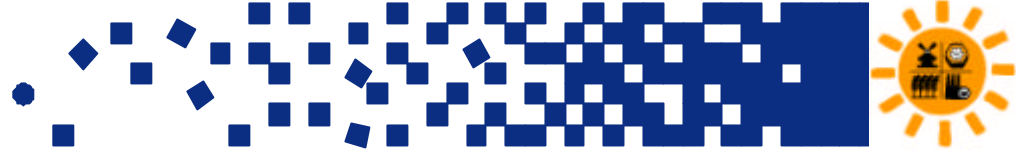


## *Fusionsenergi*

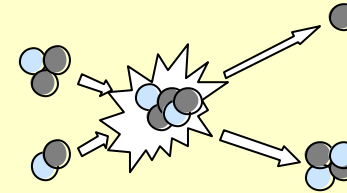
***0.7 gram fusionsbränsle  
(Deuterium + Tritium)***



***60 000 kilowattimmar  
energi***

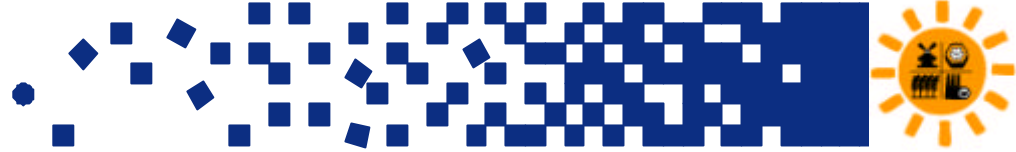


$$E=mc^2$$

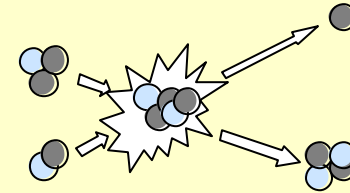


## Fusionsenergi har fördelar och nackdelar

- ⇒ **Ekonomi**
- ⇒ **Säkerhet**
- ⇒ **Miljö**
- ⇒ **När har vi fusion ?**

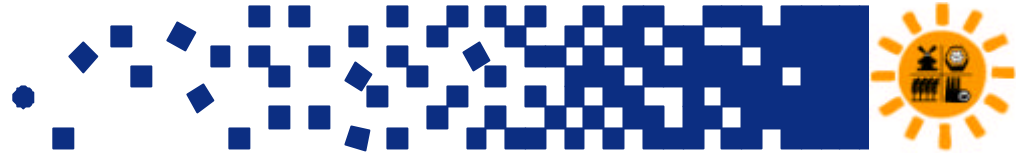


$$E=mc^2$$

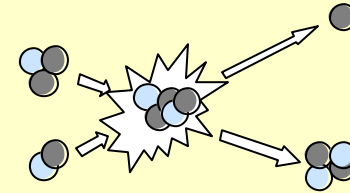


## Ekonomi

- + Bränslet kan fås överallt och finns i stora mängder
- + Låg kostnad för mark
- Hög investeringskostnad för anläggningen

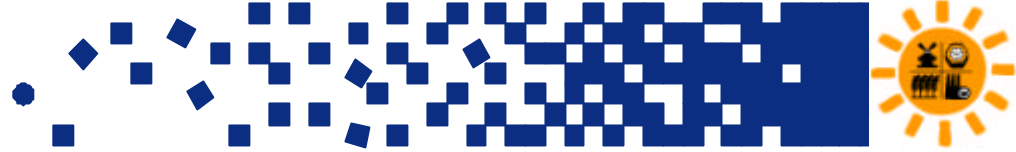


$$E=mc^2$$

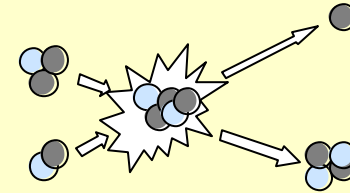


## Säkerhet

- + Inga okontrollerade reaktioner kan uppstå
- Det finns radioaktivt avfall
- Tritium gas

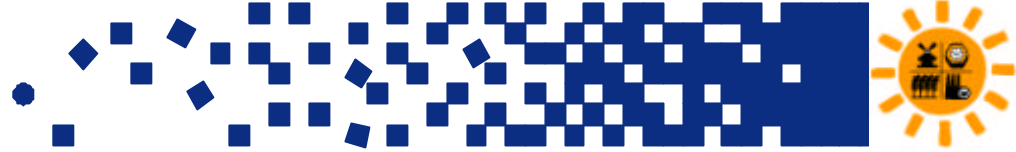


$$E=mc^2$$

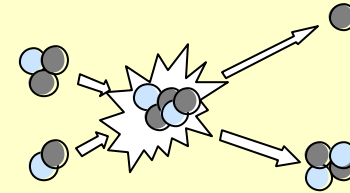


## Miljö

- + Inga växthusgaser produceras
- + Avfall kommer inte att bli en börda för framtida generationer
- + Inget krav på stora landarealer



$$E=mc^2$$

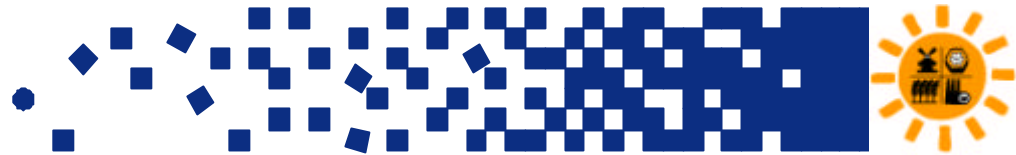


## När har vi fusion?

- 30 till 50 års väntetid
- + *International Thermonuclear Experimental Reactor (ITER)* ska byggas.

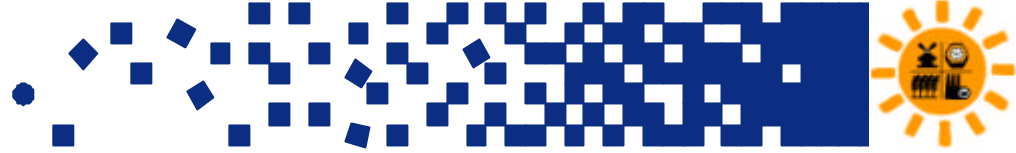


KTH 175 ÅR 2002



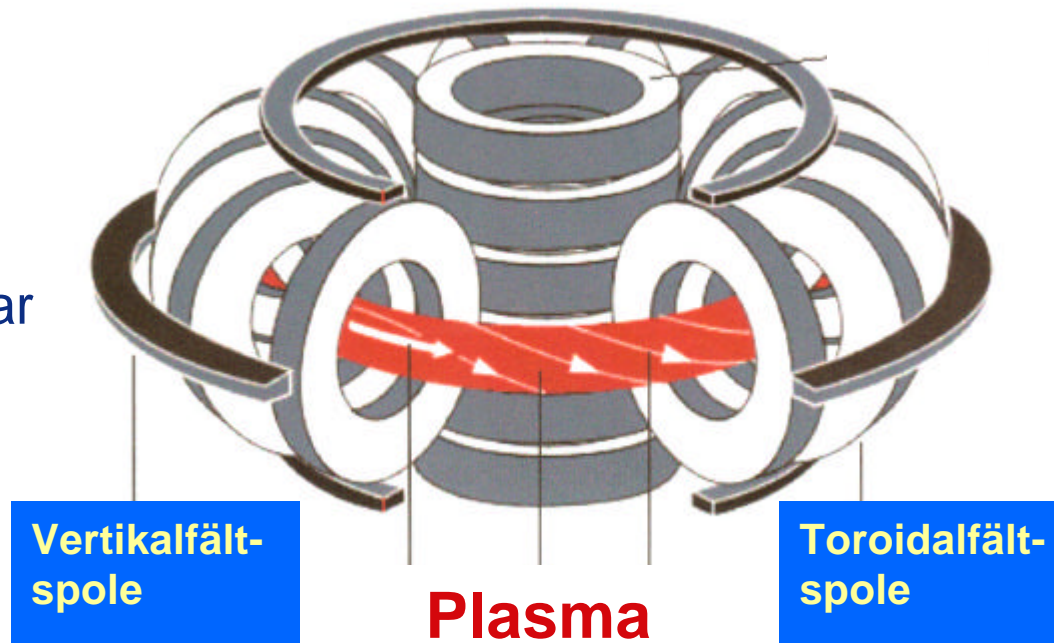
## *ITER - nästa steg på vägen mot fusionskraft*

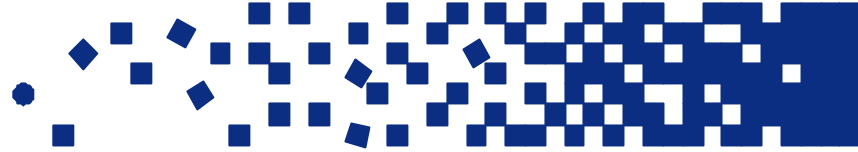
- ⇒ Kommer att demonstrera den vetenskapliga genomförbarheten
- ⇒ 600 MW fusionseffekt
- ⇒ Samarbete mellan EU + Japan + Ryssland + Kanada + (USA?)
- ⇒ Beslut att bygga ITER ska fattas 2003
- ⇒ Drift start 2013
- ⇒ 4 Miljarder Euro i investeringskostnad



## *Magnetisk fusionsanläggning*

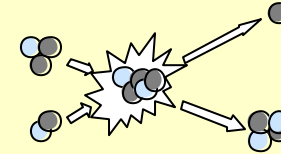
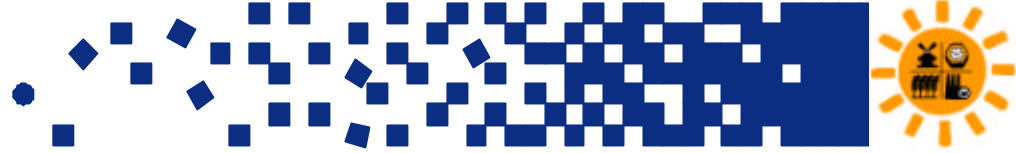
- D - T plasma
- Ringformat
- Magnetiska spolar
- Stabil jämvikt





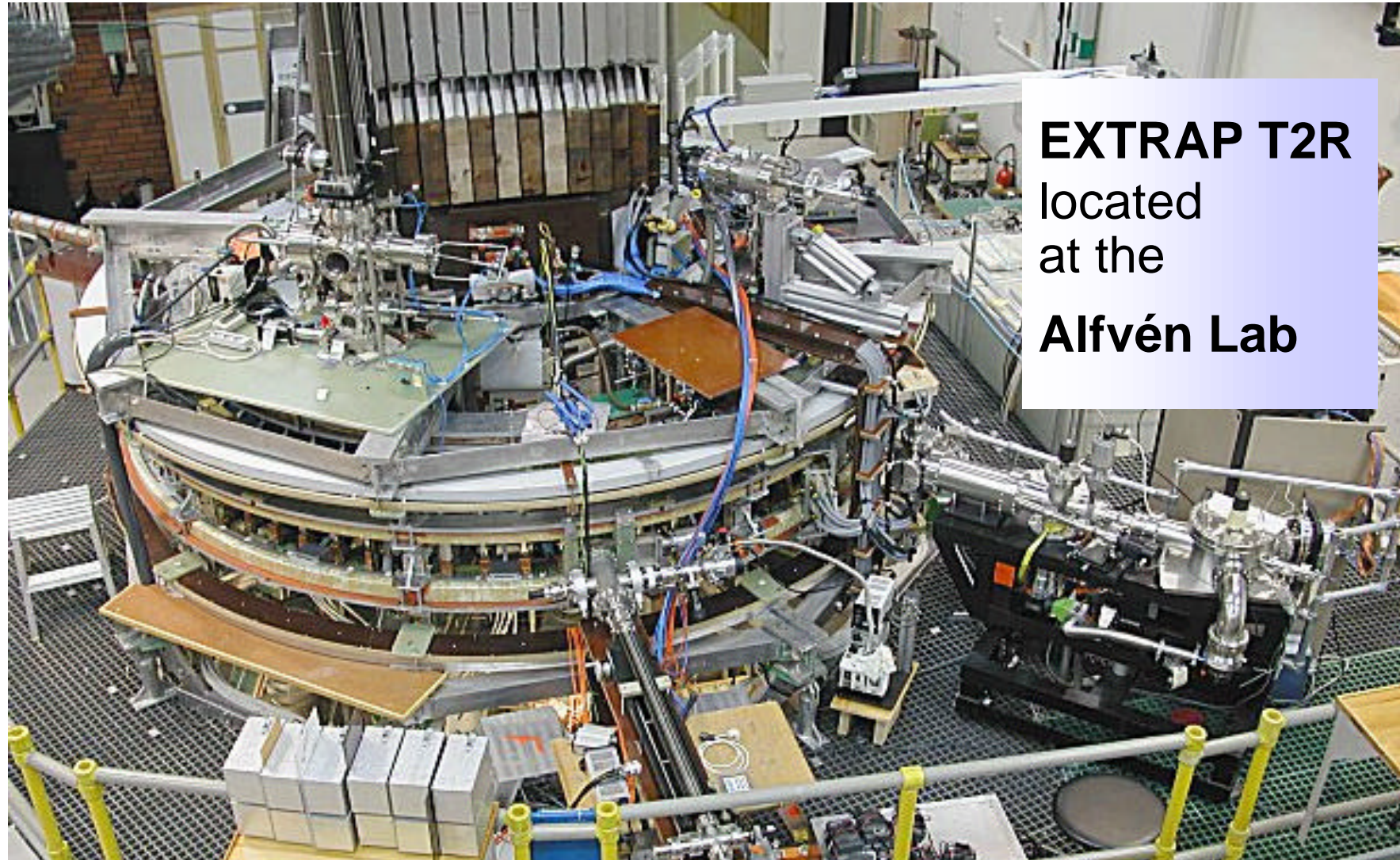
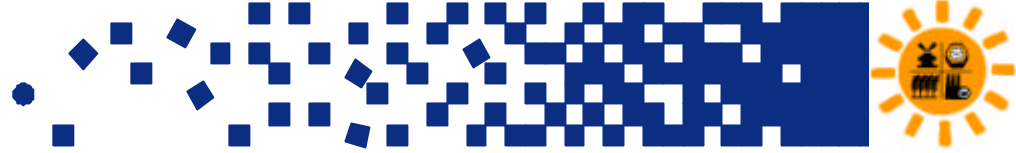
## ITER

*Prototyp  
fusions-  
reactor*



## Alfvénlaboratoriet

- ⇒ Fusionsforskningen är integrerad i EU programmet
- ⇒ Experiment och teori
- ⇒ *EXTRAP T2R*



**EXTRAP T2R**  
located  
at the  
**Alfvén Lab**