

# INTRODUCTION TO JRR-3

3<sup>rd</sup> Neutron Muon school  
Nov. 20<sup>th</sup> 2018

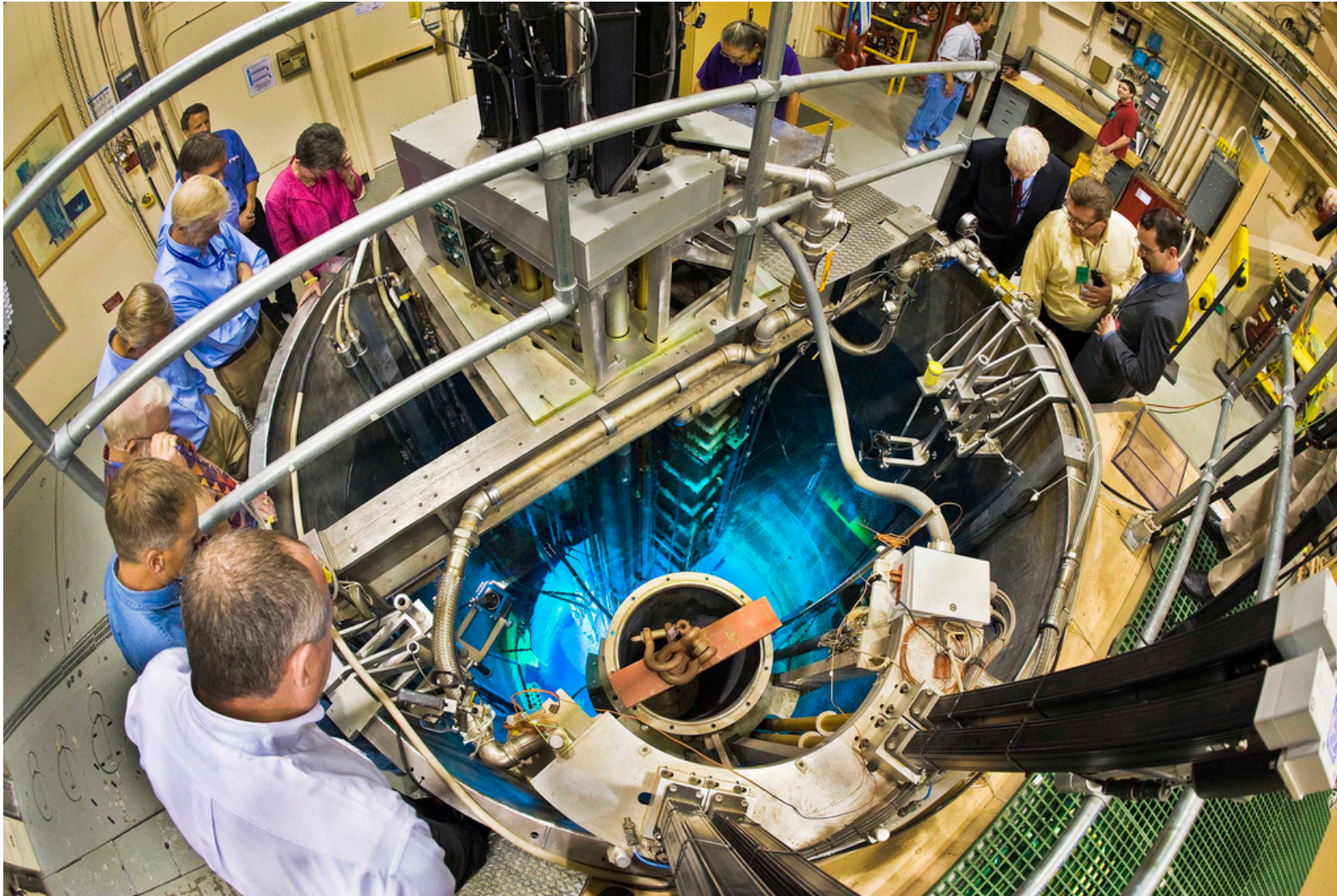
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# EVERYBODY KNOWS THEY'RE POWER PLANTS





# EXCEPT WHEN THEY'RE NOT





# HISTORY OF JRR-3

1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020

Old JRR-3

Modify

JRR-3

'59 ~ '61 Const. of Old JRR-3

'64 10 MW Critical achieved

'65 ~ '83 User facility

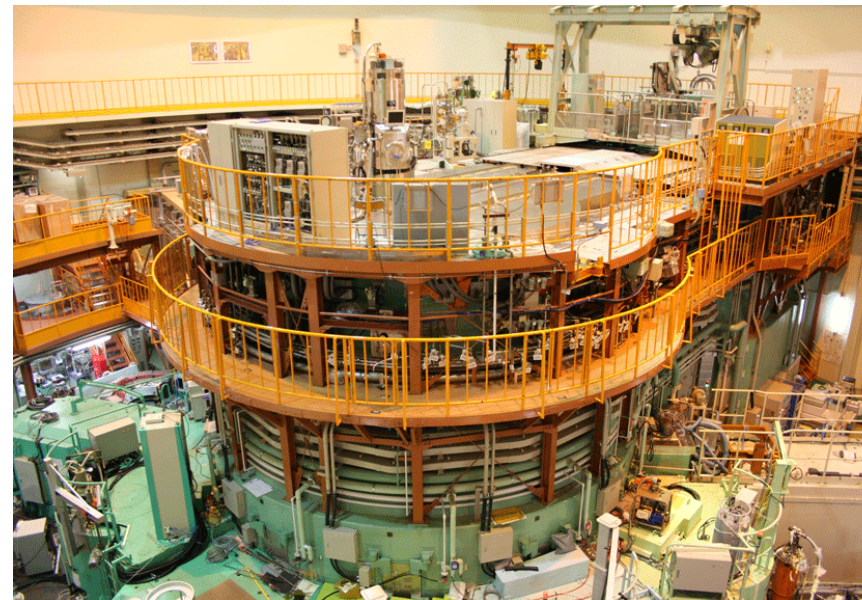
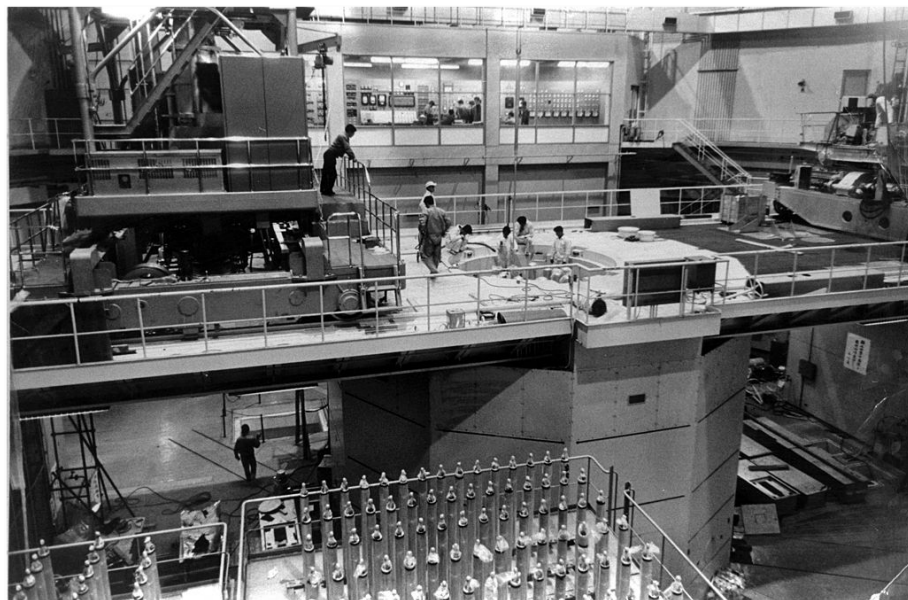
'85 ~ '90 Modification to JRR-3

'90 20 MW Critical achieved

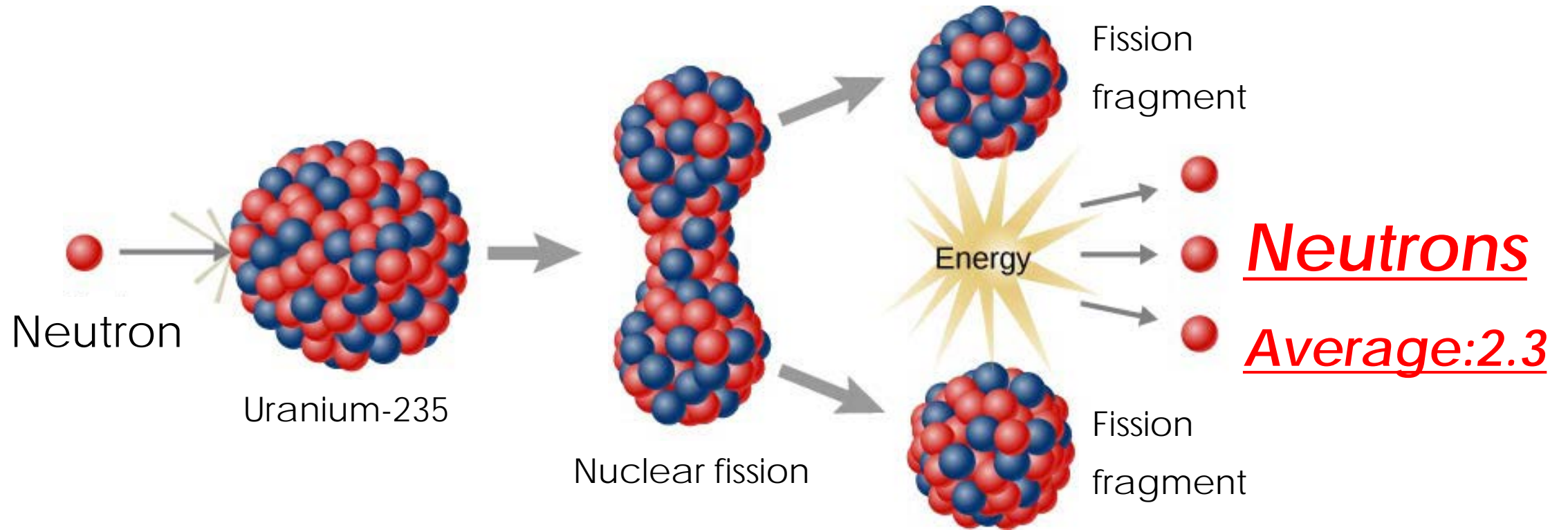
'90 ~ '10 User facility

'20 ~ Restart operation

'11 ~ Maintenance period

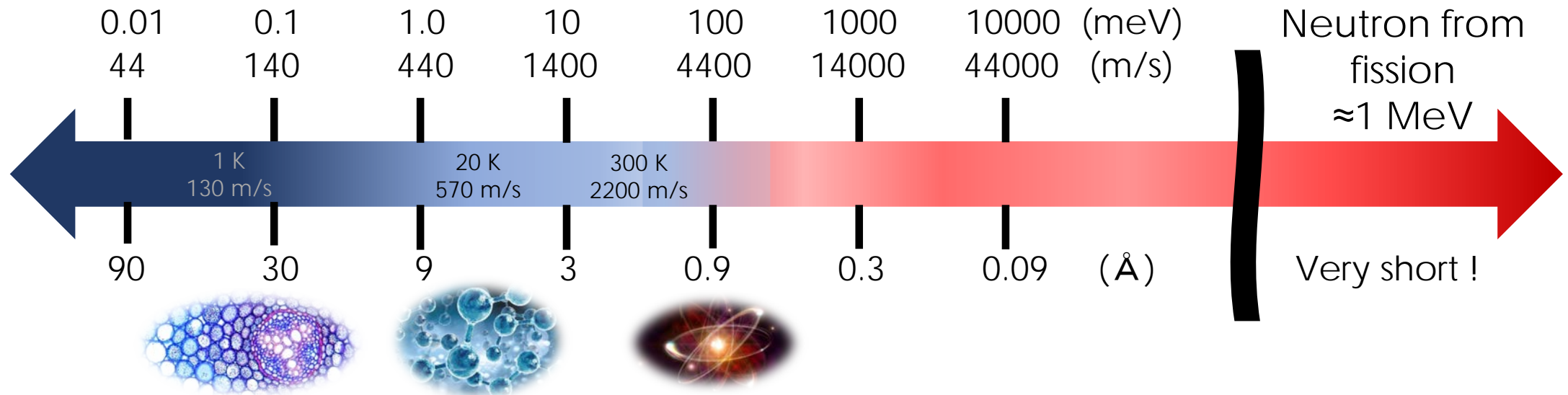


# NEUTRON FACTORY



JRR-3 is neutron factory by nuclear fission !

# NEUTRON FACTORY



Cold neutron ( $\approx 20$  K)

Thermal neutron ( $\approx 300$  K)

Fast neutron

Biological science

Material irradiation

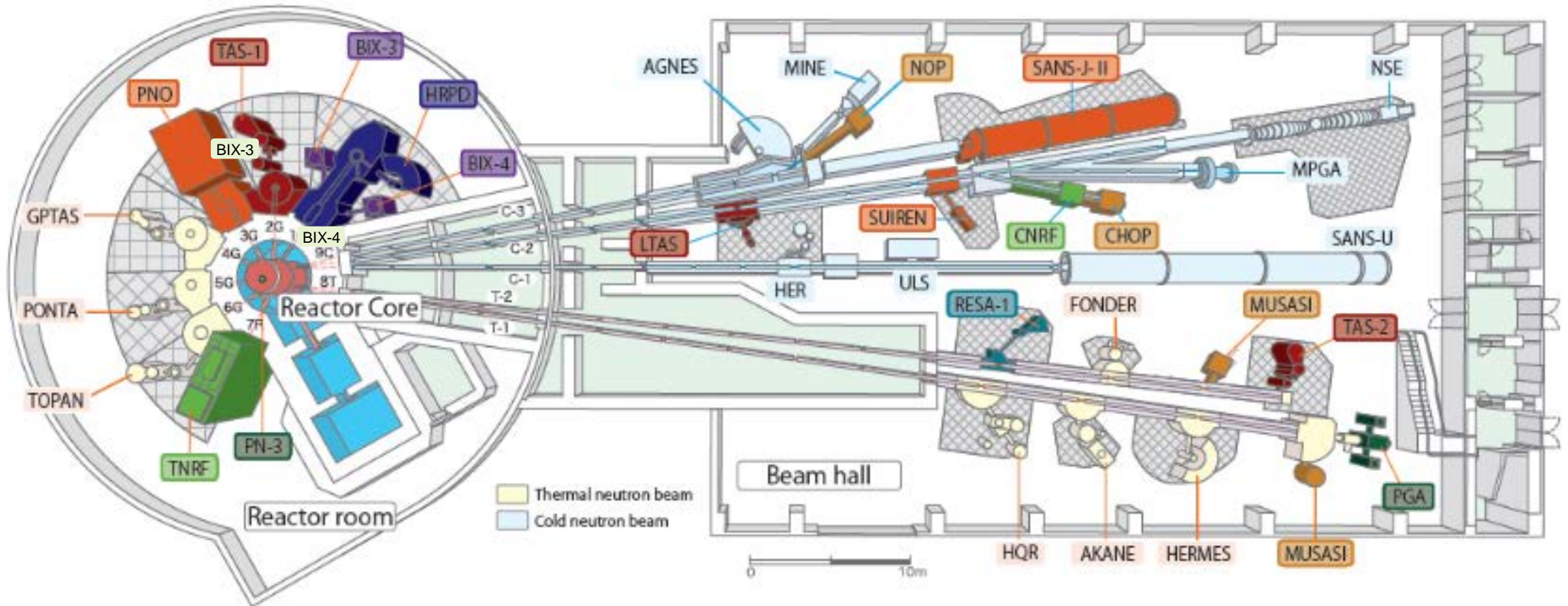
Fundamental physics

Solid state physics (Superconductor, Magnetism)

Industrial use (Neutron radiography, NAA)



# LAYOUT OF JRR-3

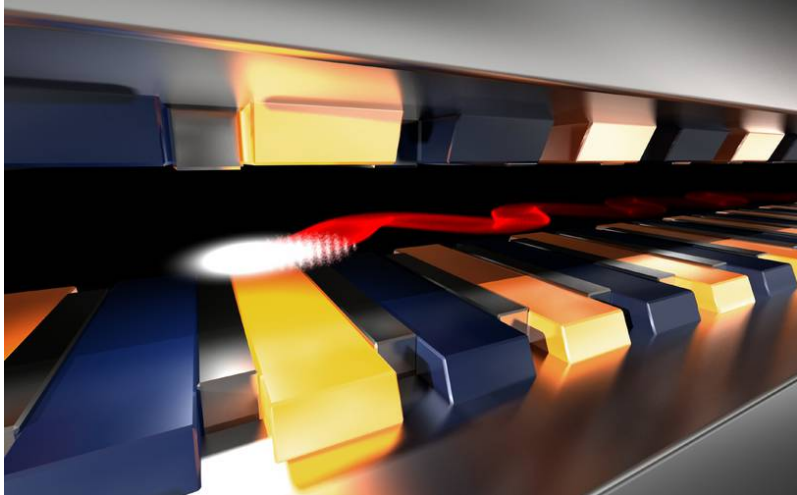
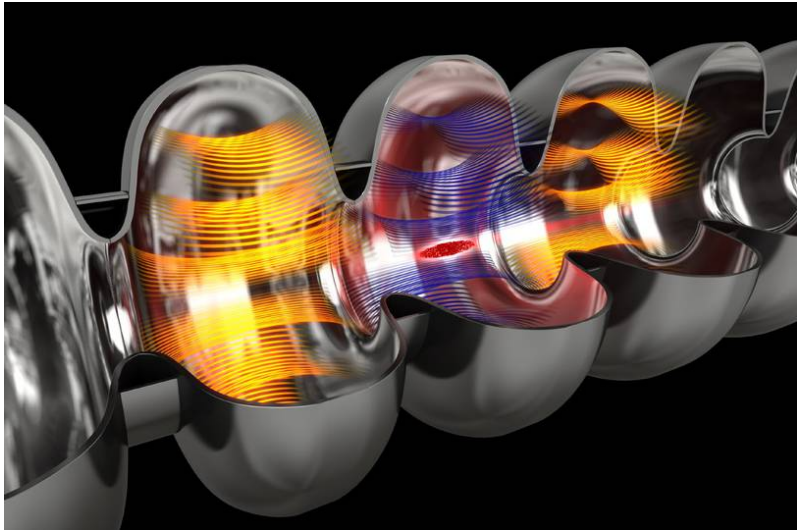


Reactor room

Beam hall



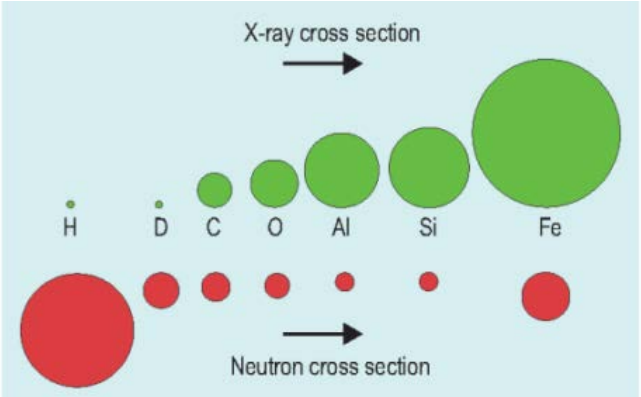
# X-RAY IS NOT ENOUGH ?



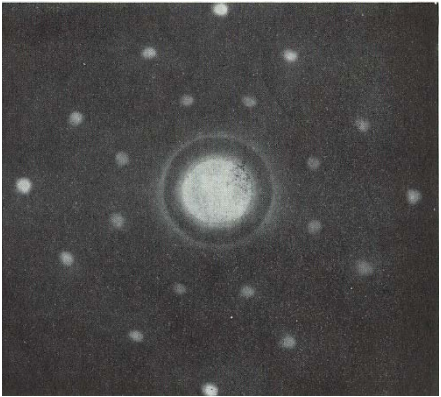


# NEUTRON'S PROPERTIES

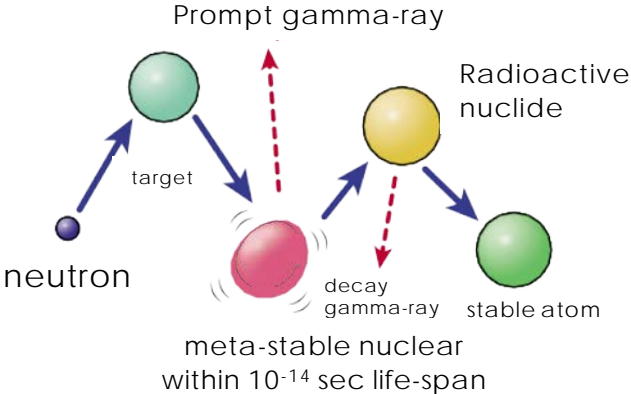
Visibility for the light atom



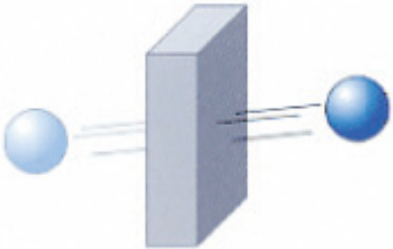
Crystallography



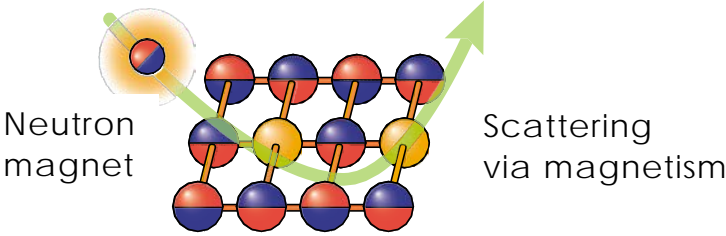
Element analysis



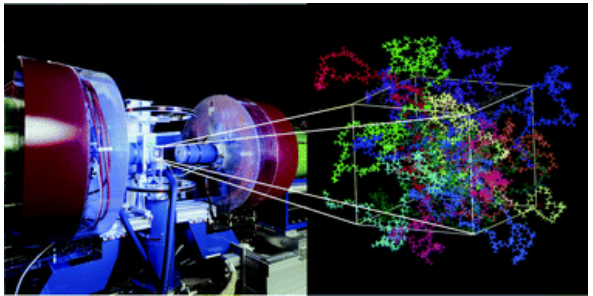
Permeability



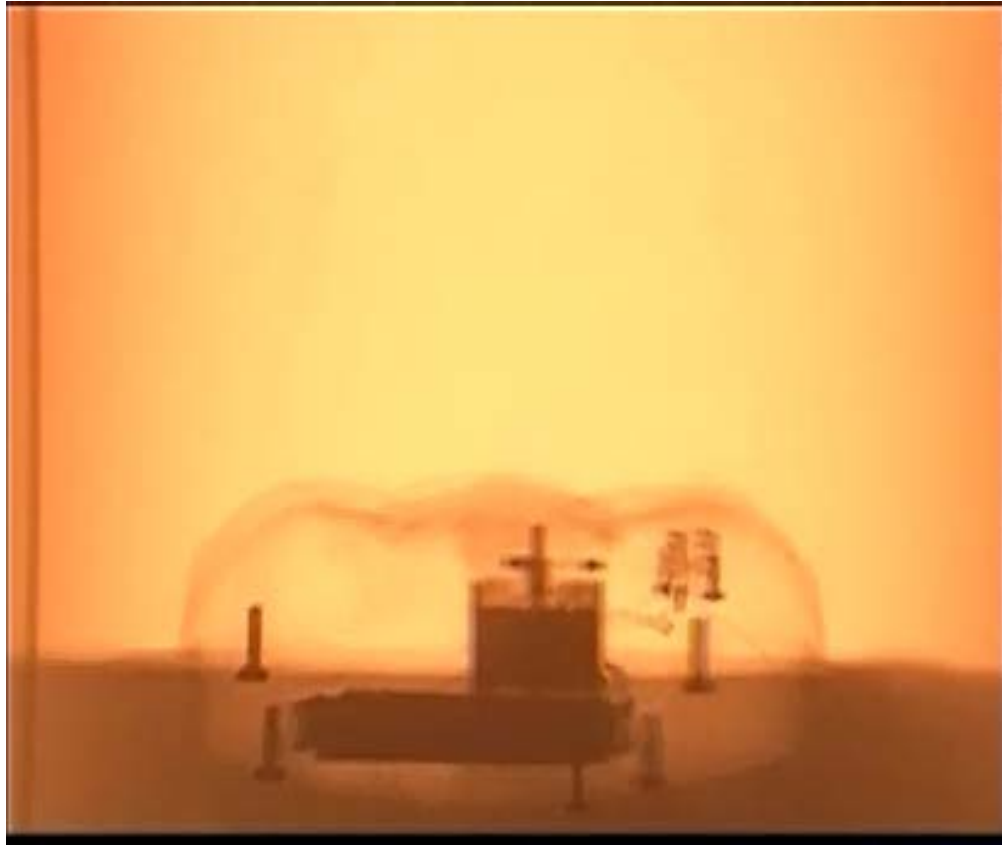
Magnetism



Atomic dynamics



# WHY NEUTRON ?



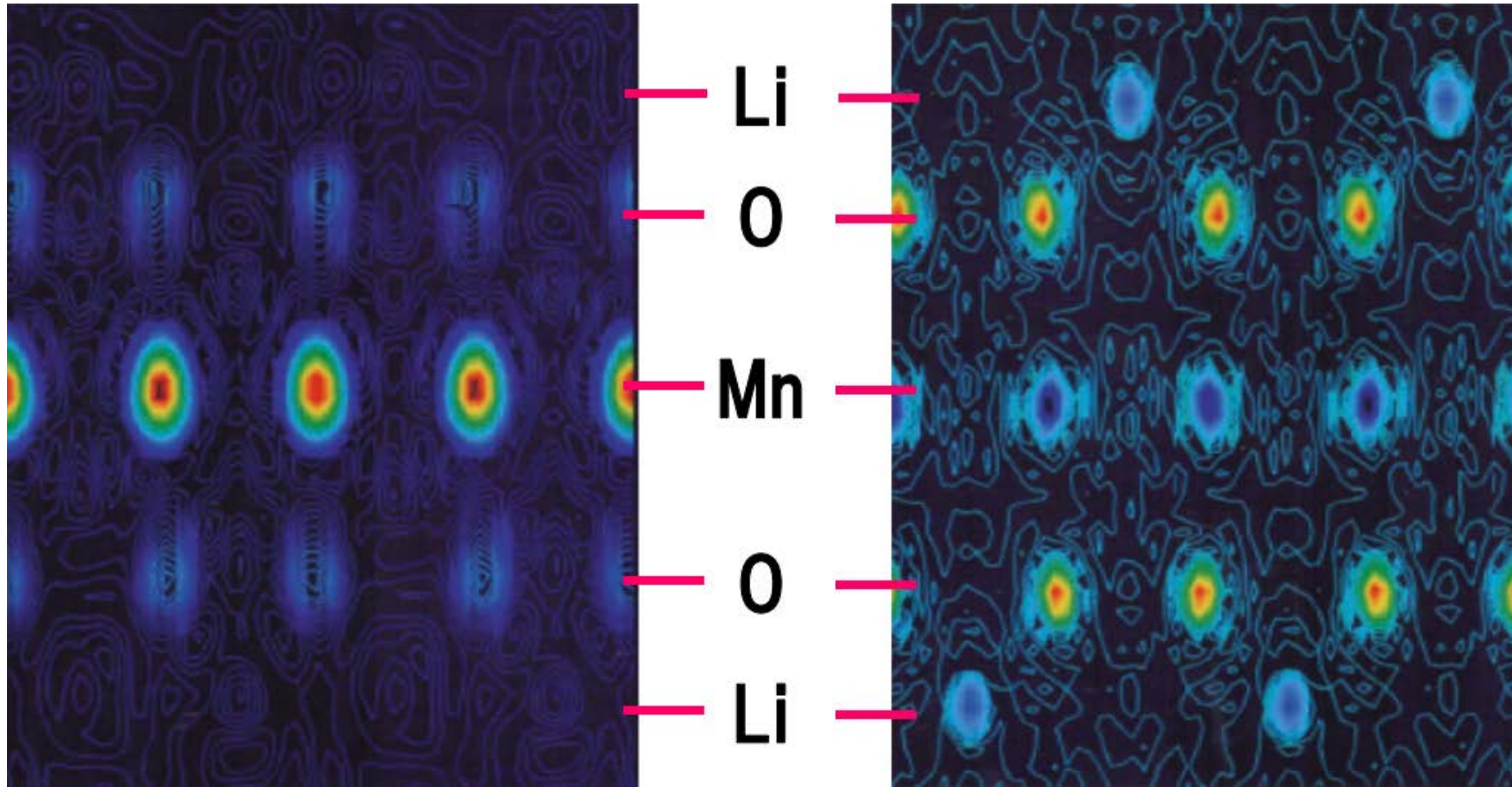
X-ray



Neutron



# WHY NEUTRON ?



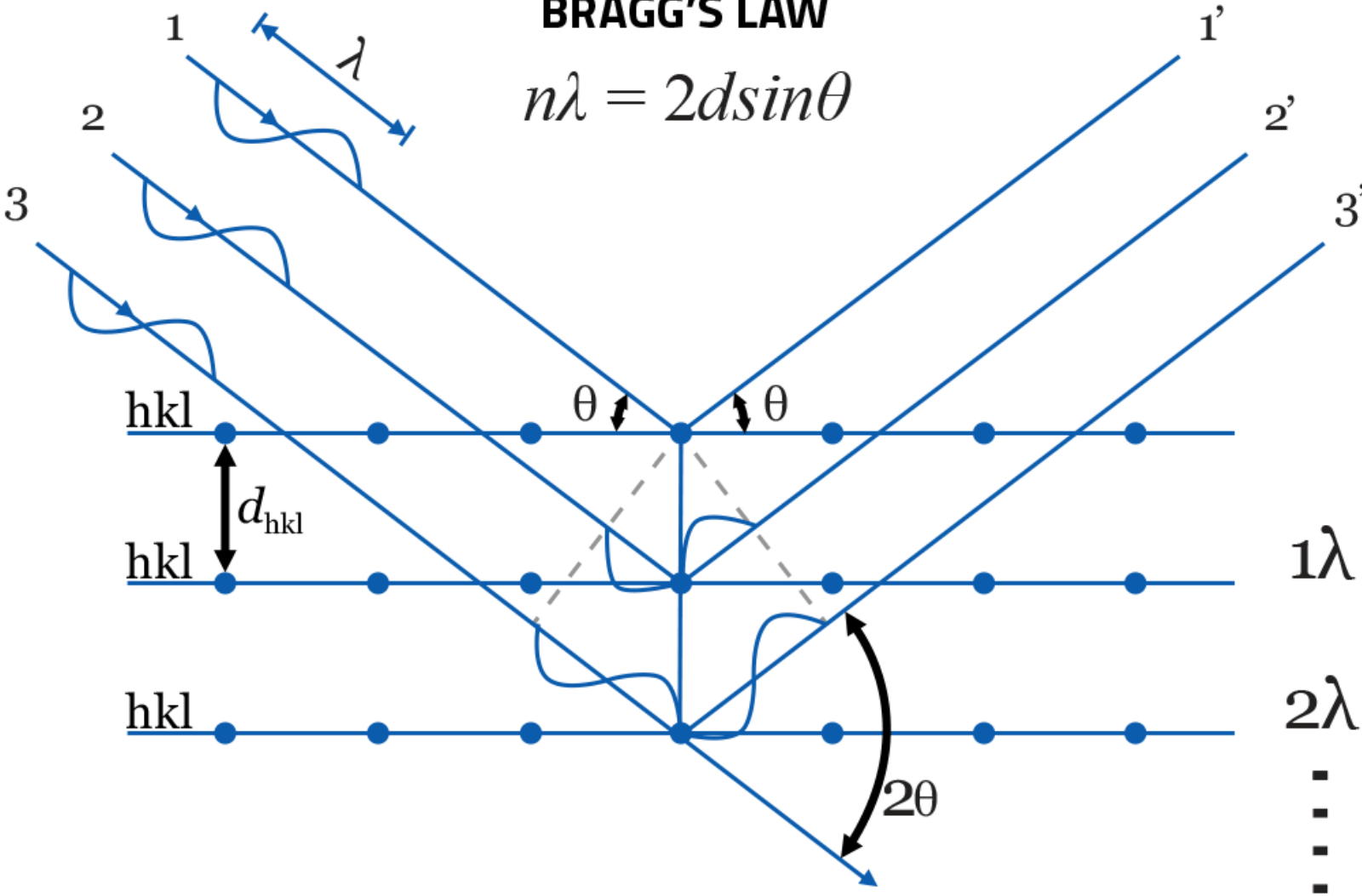
X-ray

Neutron

# HOW DO WE DO

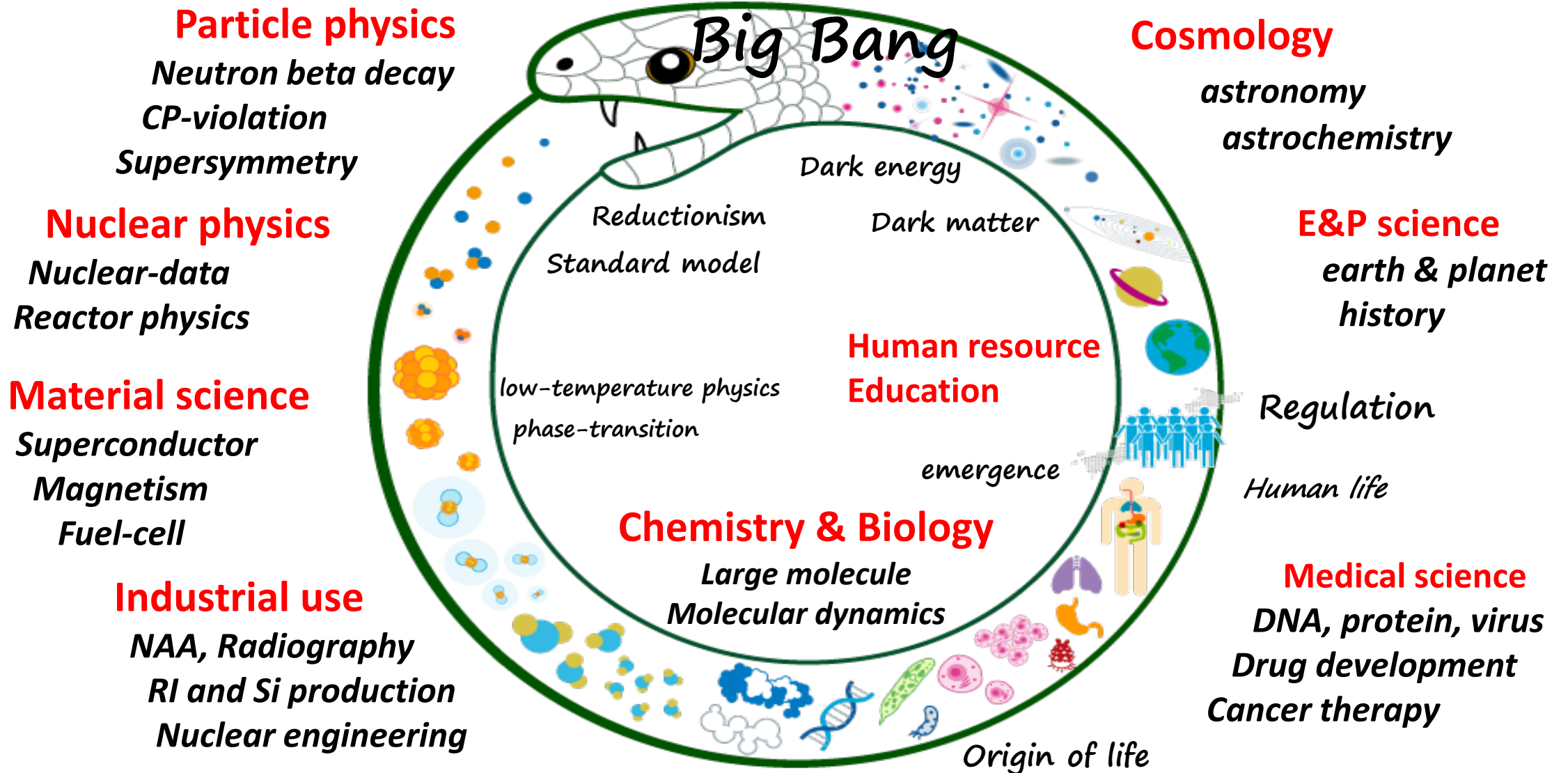
## BRAGG'S LAW

$$n\lambda = 2d\sin\theta$$

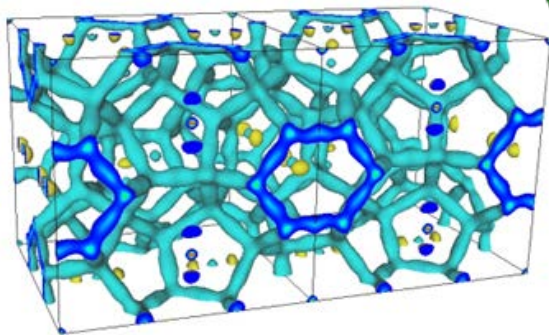
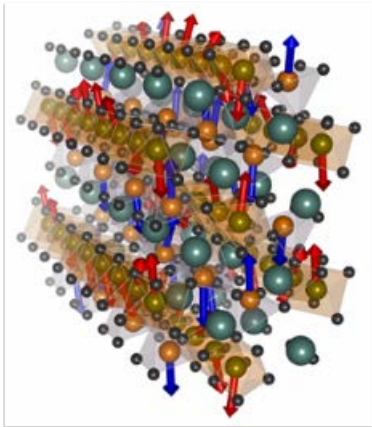
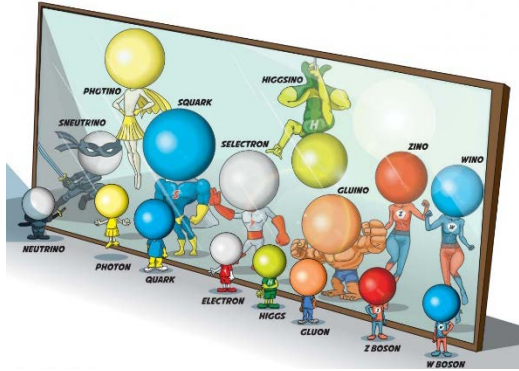




# SCIENCE FROM JRR-3

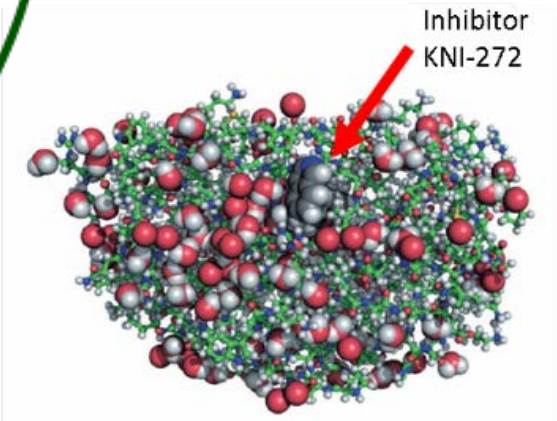
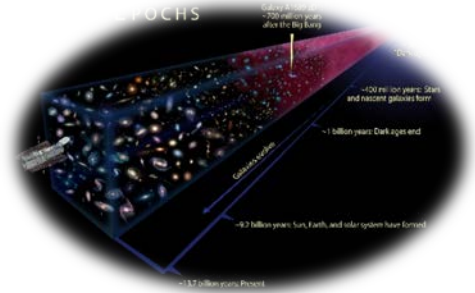


# SCIENCE FROM JRR-3



## Big Bang

From particles to cosmos,  
What is the Universe made of?  
To see it, understand it, and control it.







Thank you  
for your attention