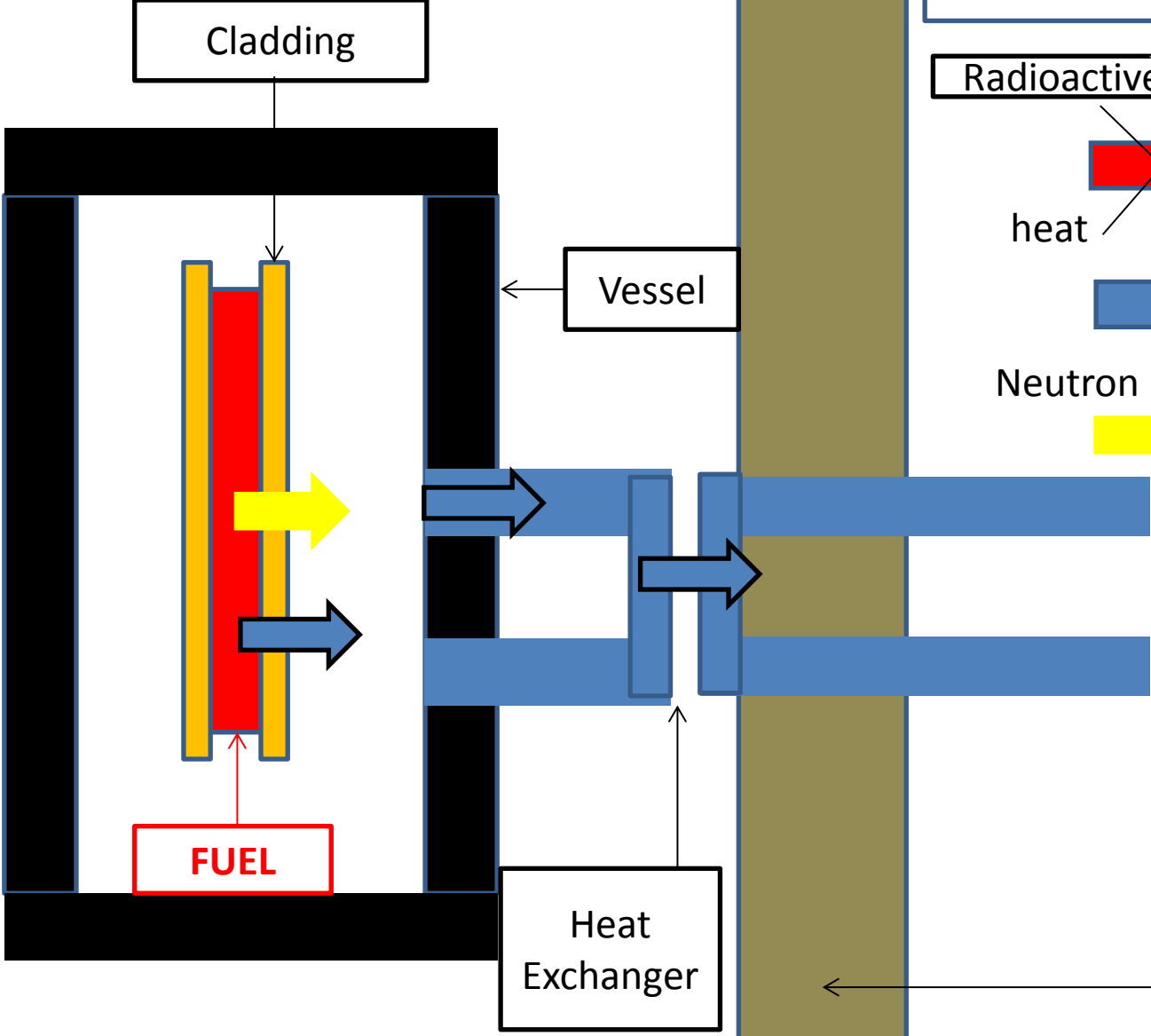
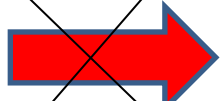


# **Preliminary remarks**

**FRONTIERS**



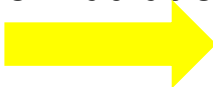
**Radioactive matter**



heat



Neutron radiation



**Containment**

# Heat exchange : a major issue

## Coolant : a central actor

- **Conflicting requirements**: confine radioactivity and transmit heat
- Importance of **exchange surfaces** : maximize surface to minimize thermal gradients
- Requirements for **thermodynamic efficiency** : increase temperature, increase pressure
- **Avoid phase transformation** in the fluid!!!

# Technological improvements and their consequences

	Phenix	Superphenix
Cladding failuer	15	1
Na/water contact	5	0
Na leaks	32	3
Primary and secondary pumps	All were repeared	0
Heat exchangers	All repeared several times	0
Vapour generators	All repeared after deposition	0