

Fusion Roadmap and the role of fusion-like neutron sources

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DONES Business Info Day
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MAKE OUR DREAMS A REALITY

CONTROL THE ENERGY THAT KEEPS THE UNIVERSE ALIVE

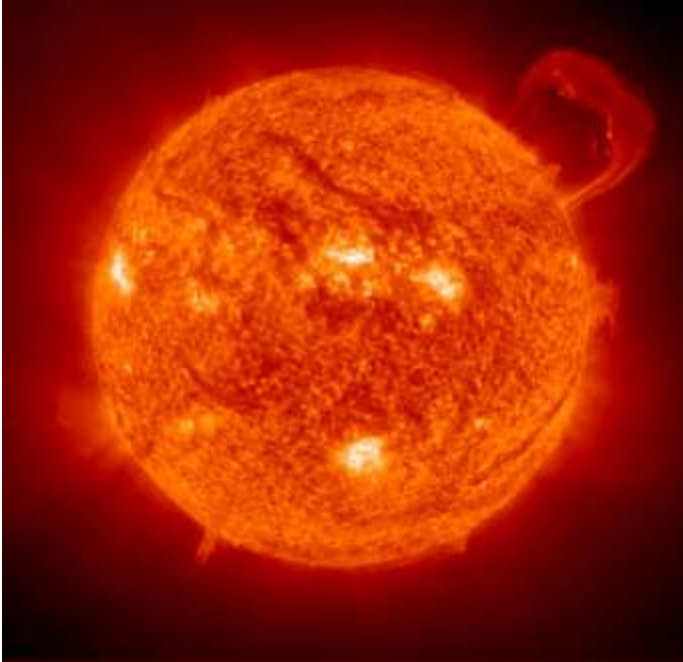
Spiral Galaxy M51

150,000 million times the mass of the SUN at 23 light years from earth

FUSION ENERGY
 $E = \Delta m c^2$

Small change in the mass, an amazing release of energy

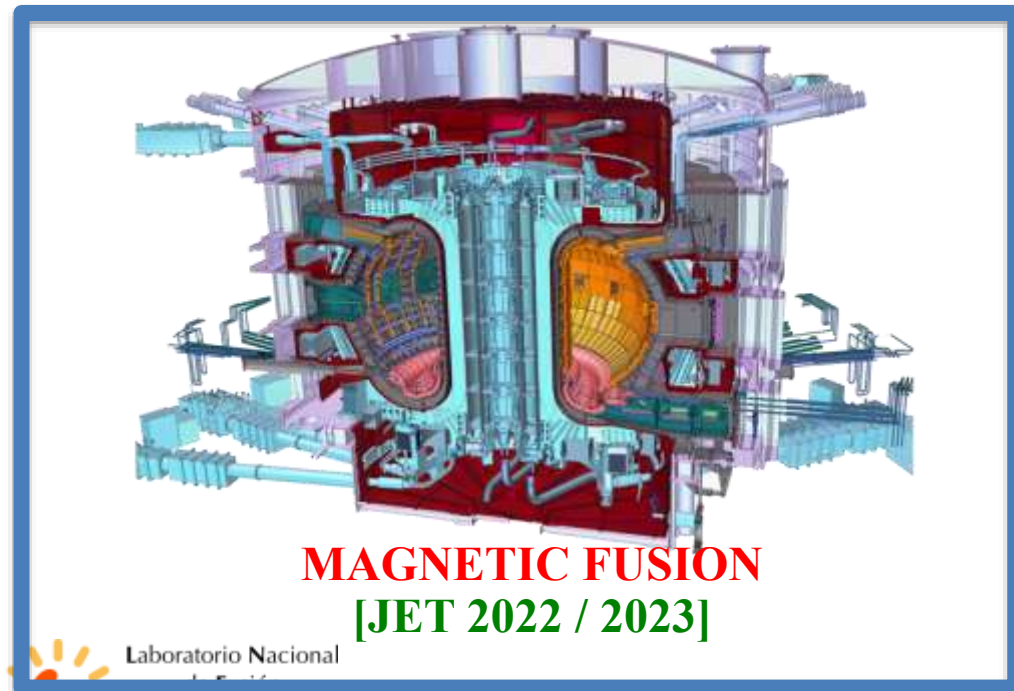
OUR DREAMS CAME TRUE: FUSION ENERGY ON EARTH



Gravitational Confinement



INERTIAL FUSION
[NIF 2022 / 2023]

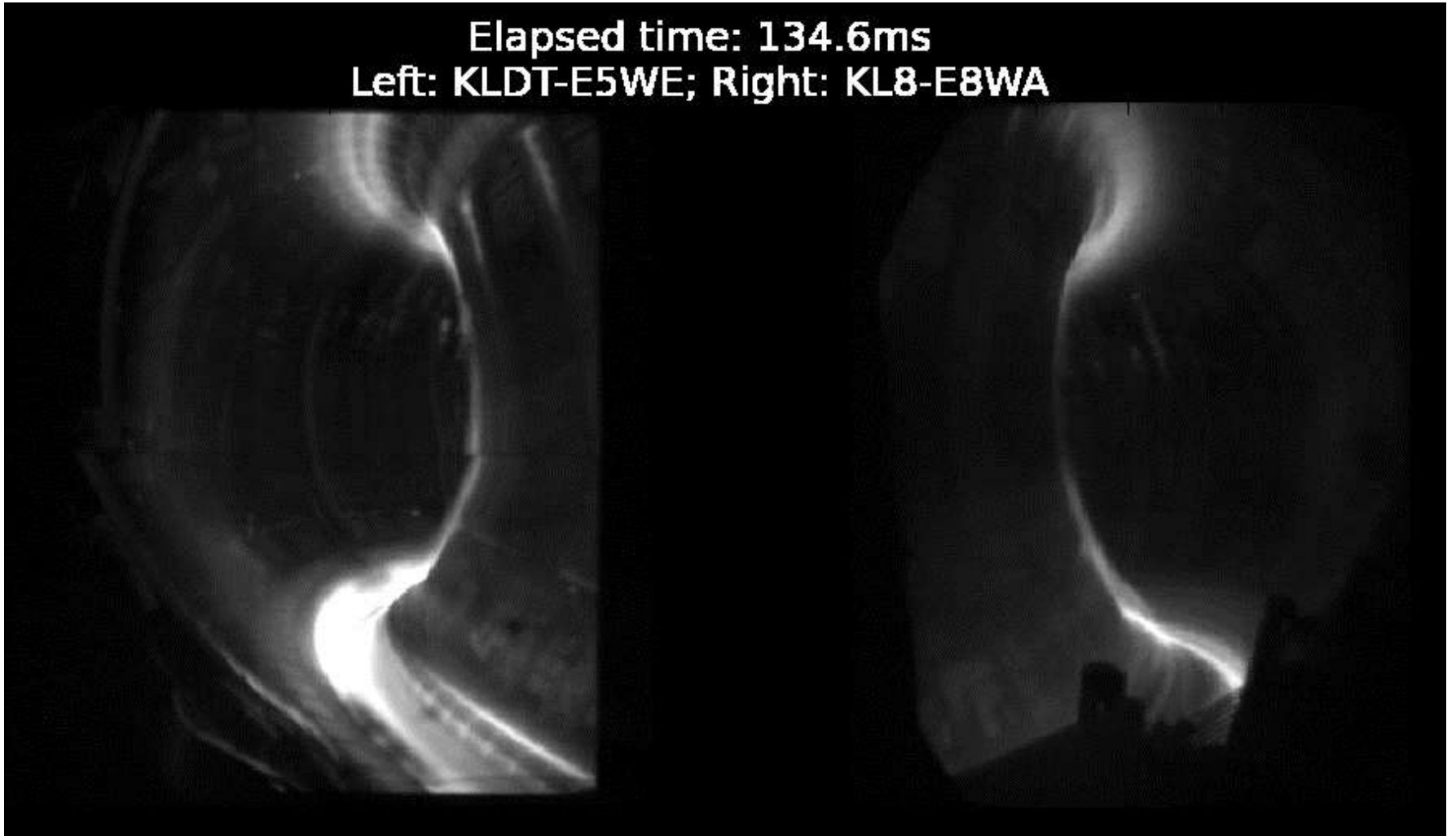


MAGNETIC FUSION
[JET 2022 / 2023]

OUR DREAMS CAME TRUE

Record of magnetic fusion energy [JET, Feb 2022 / Nov 23]

Elapsed time: 134.6ms
Left: KLDT-E5WE; Right: KL8-E8WA



MAKE OUR DREAMS A REALITY: FUSION ENERGY FOR SOCIETY



EU Fusion Roadmap (2023)

PARALLELIZATION of activities for the **ACCELERATION** of fusion energy for society

OUR PENDING CHALLENGES

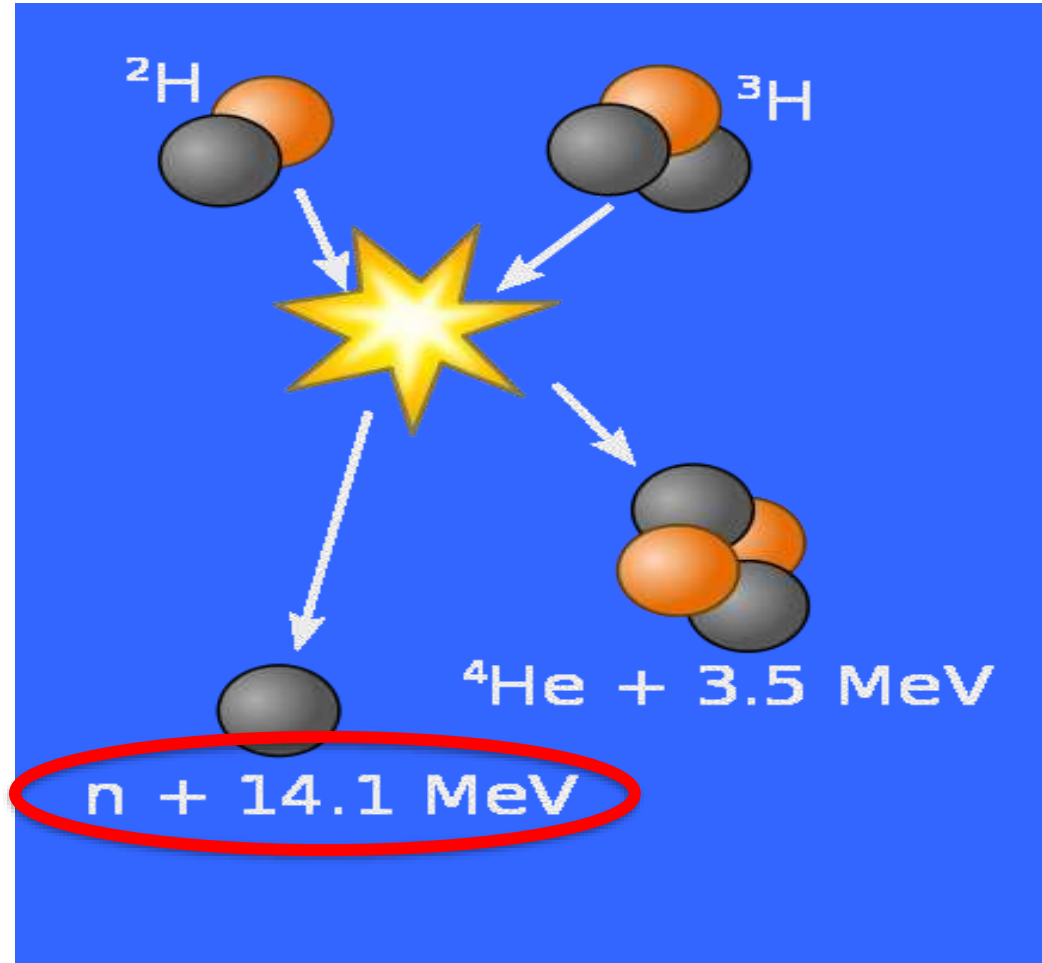
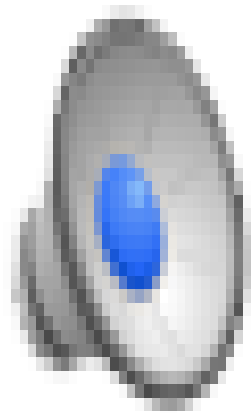
FUSION ENERGY FOR SOCIETY

VALIDATION OF MATERIALS UNDER NEUTRON IRRADIATION

VALIDATION OF TRITIUM TECHNOLOGIES

VALIDATION OF MATERIALS UNDER HIGH HEAT FLUXES

VALIDATION OF MATERIALS UNDER NEUTRON IRRADIATION



VALIDATION OF MATERIALS UNDER NEUTRON IRRADIATION: IFMIF – DONES [March 2023 / 1st Steering Committee]



DONES: Key facility for the deployment of Fusion Energy
[MATERIALS VALIDATION]

VALIDATION OF MATERIALS UNDER NEUTRON IRRADIATION: **IFMIF – DONES** [March 2023 / 1st Steering Committee]



IFMIF-DONES: fusion-like neutron source

Identified as high priority in the EU Fusion Roadmap

“Broader Approach” EU-Japan collaboration [LIPAc / IFMIF-DONES]

**DONES: Key facility for the deployment of Fusion Energy
[MATERIALS VALIDATION]**

OUR PENDING CHALLENGES

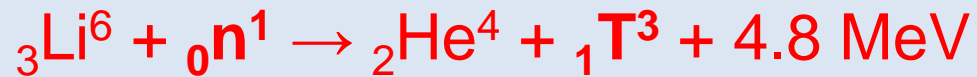
FUSION ENERGY FOR SOCIETY

VALIDATION OF MATERIALS UNDER NEUTRON IRRADIATION

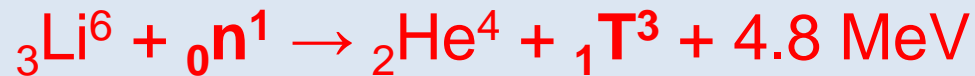
VALIDATION OF TRITIUM TECHNOLOGIES

VALIDATION OF MATERIALS UNDER HIGH HEAT FLUXES

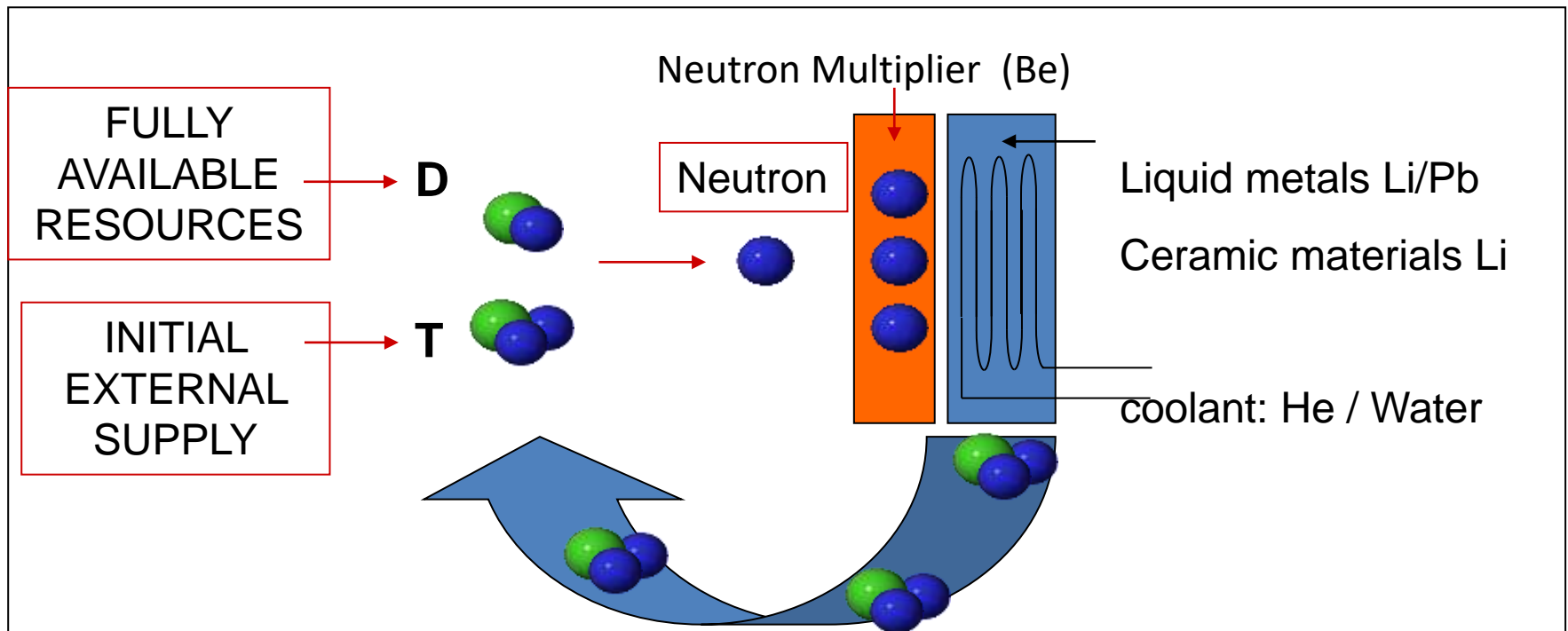
VALIDATION OF TRITIUM TECHNOLOGIES



VALIDATION OF TRITIUM TECHNOLOGIES



Tritium “breeding blanket”



DONES: Key facility for the deployment of Fusion Energy
[Basic validation of Tritium Technology]

OUR PENDING CHALLENGES

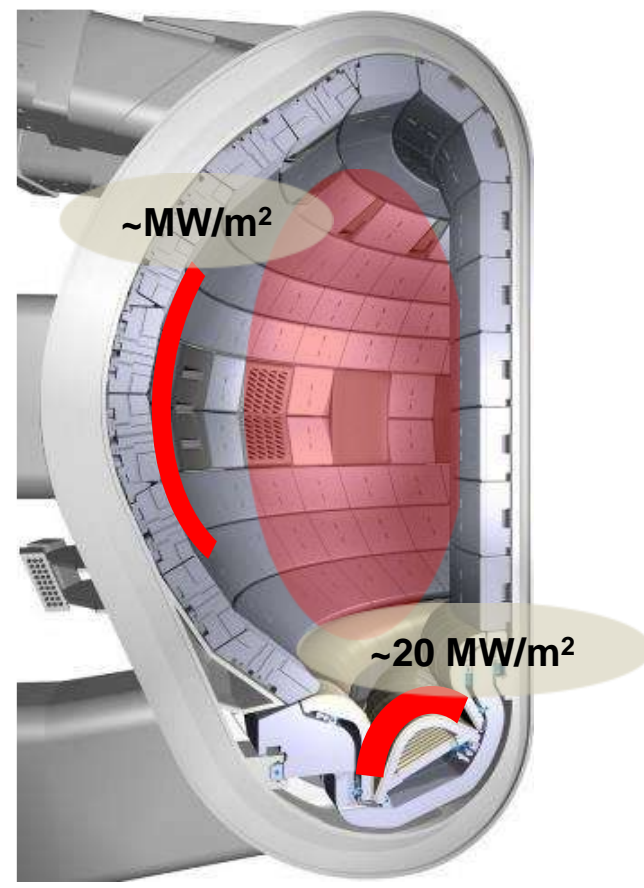
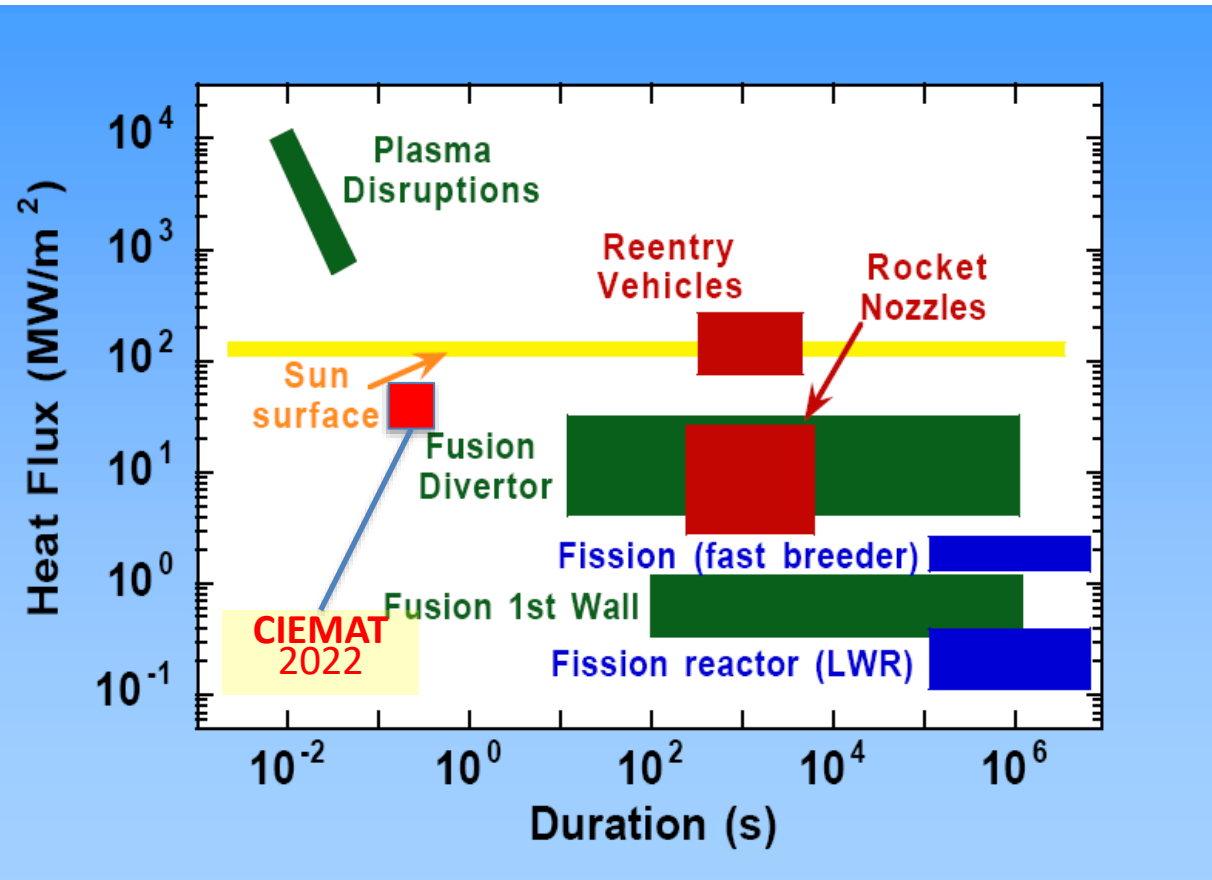
FUSION ENERGY FOR SOCIETY

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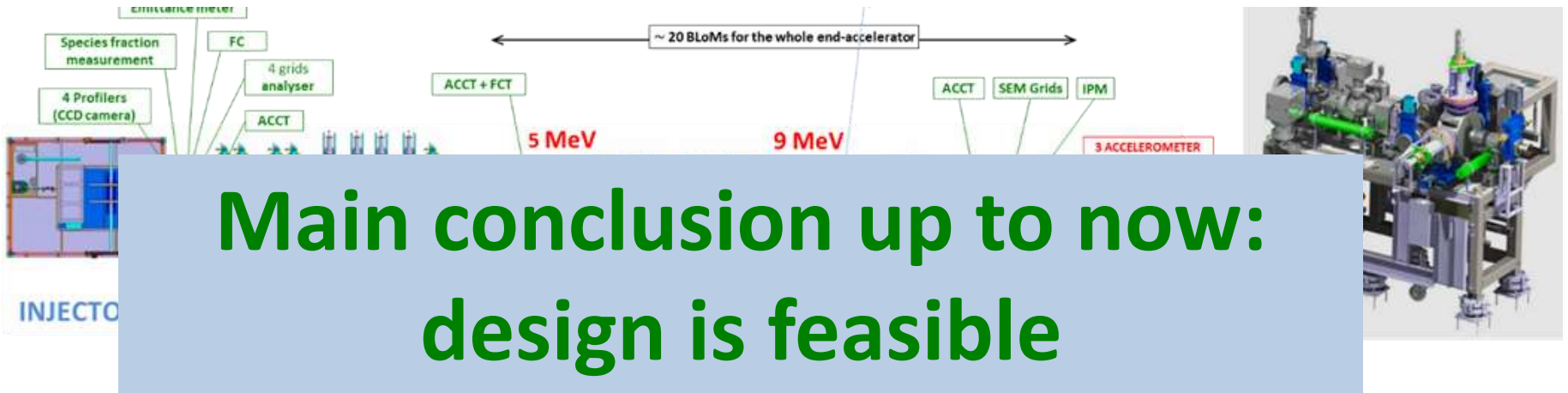
VALIDATION OF MATERIALS UNDER HIGH HEAT FLUXES



Advanced materials technology: Behavior of advanced materials in “steady” conditions and energy flows in the range of 10 - 100 MW / m²

Working towards IFMIF-DONES

Linear IFMIF Prototype Accelerator (LIPAc) in Rokkasho
“Broader Approach” Agreement EU-Japan



OUR PENDING CHALLENGES

FUSION ENERGY FOR SOCIETY

VALIDATION OF MATERIALS UNDER NEUTRON IRRADIATION

URGENT NEED
OF NEUTRON
SOURCES

VALIDATION OF TRITIUM TECHNOLOGIES

VALIDATION OF MATERIALS UNDER HIGH HEAT FLUXES

GRAND CHALLENGES IN THE XXI CENTURY: SCIENCE FOR SOCIETY

FUSION ENERGY
GRAND CHALLENGE FOR HUMANITY

IFMIF-DONES
KEY FACILITY
TO MAKE OUR DREAMS A REALITY

OPPORTUNITIES FOR INDUSTRY