

# J-PARC MLF 2nd Target Station

# World trend : High intensity accelerator driven n and $\mu$ source

ESS, (EU) 5 MW 2022~

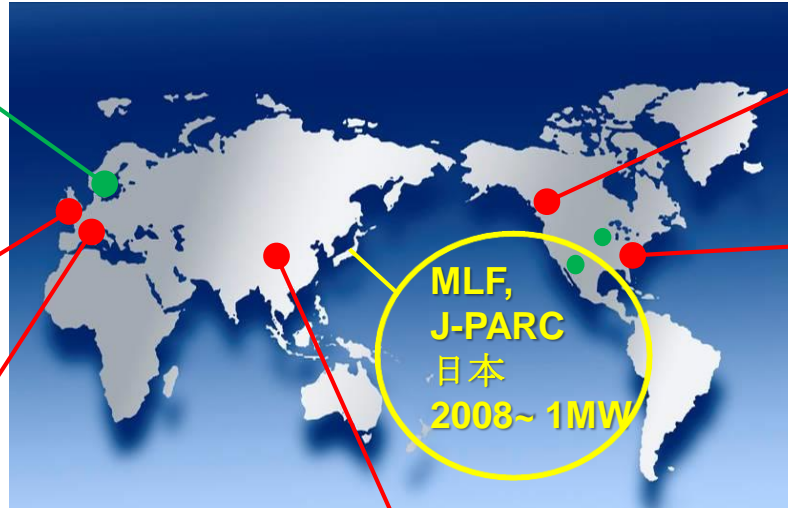
High intensity neutron



ISIS, RAL, (UK)  
1985~ 0.2MW  
2<sup>nd</sup> Target Station  
2008~ 0.05MW



PSI (Switzerland)  
2010~ 1.5MW  
Improvement of muon target and beamline



TRIUMF  
0.1MW



SNS, ORNL (U.S.A.)  
2006~ 1.4MW

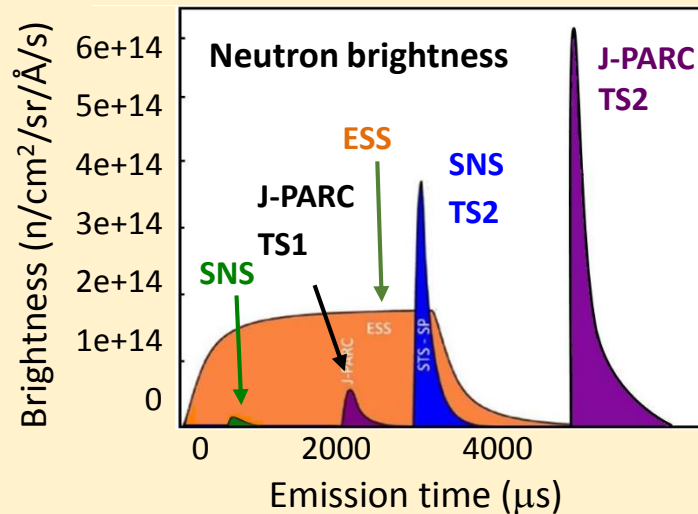
Construction of new TS including muon facility

CSNS, China  
2017~ 0.2 MW



J-PARC MLF should be

- top runner of the world
- leader of Asia and Oceania

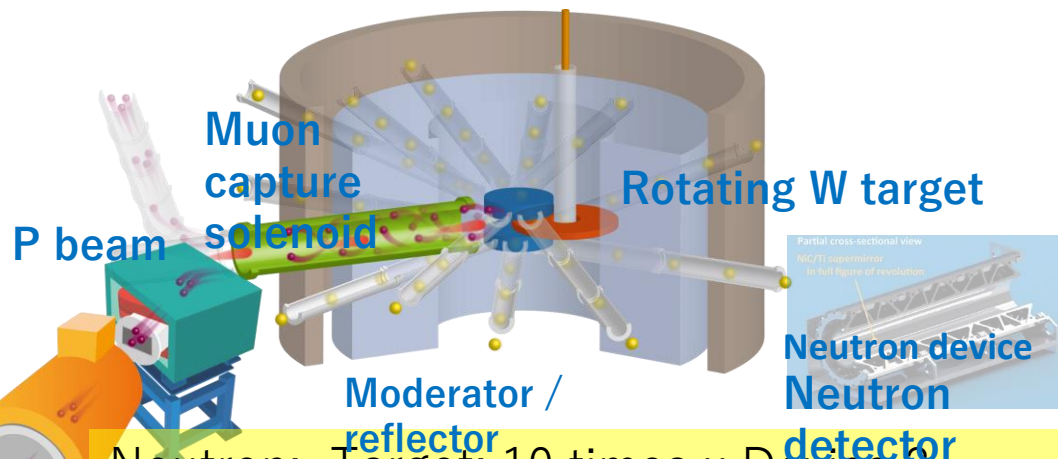


**SNS TS2 is 5 times higher than J-PARC TS1, J-PARC TS2 will be more than SNS TS2.**

J-PARC 2TS



# TS2; A unified Target for neutron and muon production



Neutron: Target: 10 times x Device 2 time  
 Muon: Target 10 times x Capture solenoid 5  
 → Aiming to more than 20 times brilliance  
 ~10 times  
 → Aiming to 50~100 times intensity

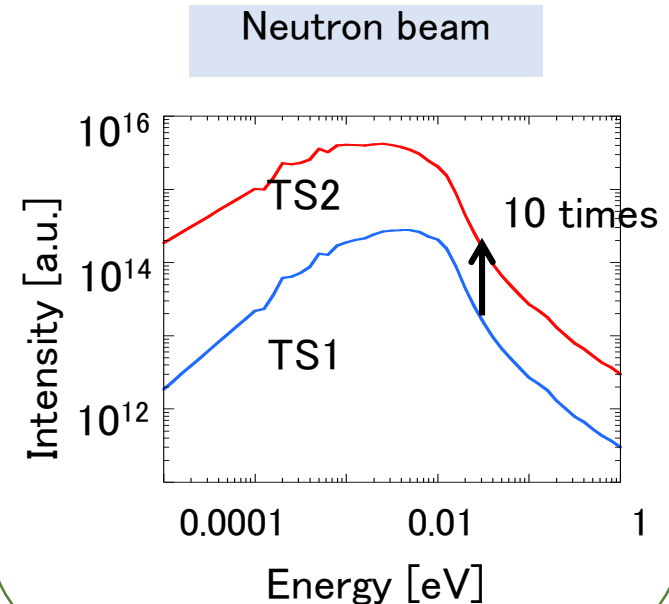
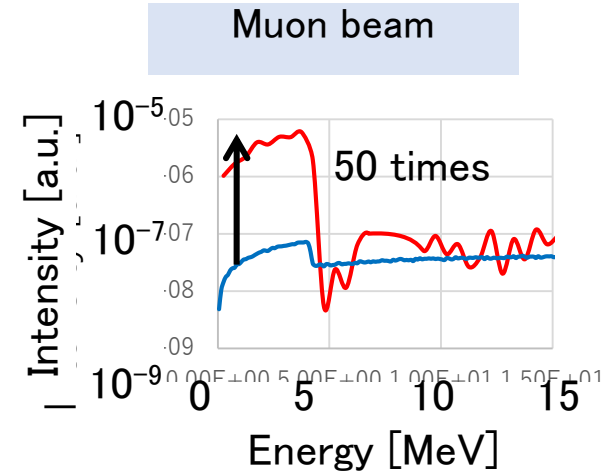
## Accelerator upgrad

Effective utilization of long wave neutron

Beam power 1 MW → 1.5 MW (TS1:1MW, TS2: 0.5MW)  
 Repetition 25 Hz → 25 HZ (TS1:17Hz, **TS2: 8Hz**)

		1 MW operation	1.5 MW operation
Ion source current	[mA]	50	62.5
Pulse width	[ms]	500	600
Repetition	[Hz]	25	25
Average current	[μA]	333.3	500
LINAC	[MeV]	400	400
RCS	[GeV]	3	3

## Neutron • muon intensity



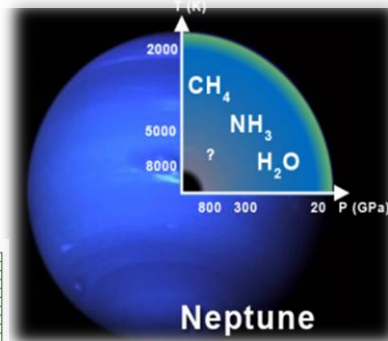
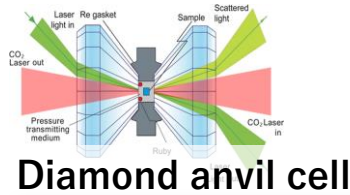
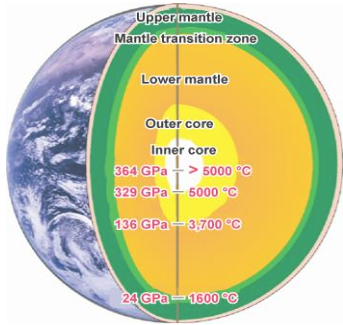
High brilliant neutron/muon → micro beam

(complimentary use)

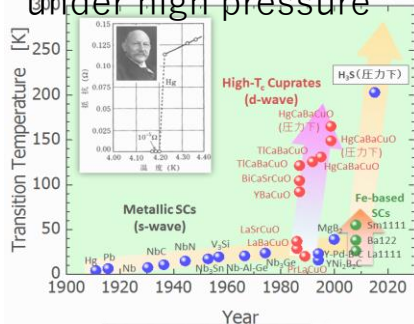
## Extreme condition

(High pressure, high magnetic field)

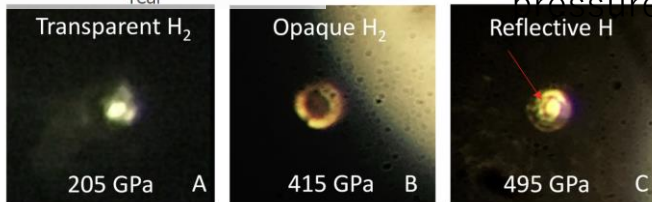
Earth/Planetary Science microsample



HgS;  
Superconductivity  
under high pressure



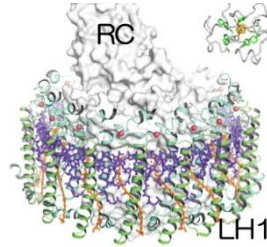
Hydrogen  
metallization  
under high  
pressure



## Bio Science

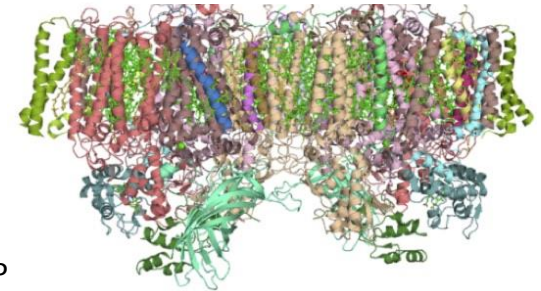
Micro protein sample

Protein related to  
photosynthesis



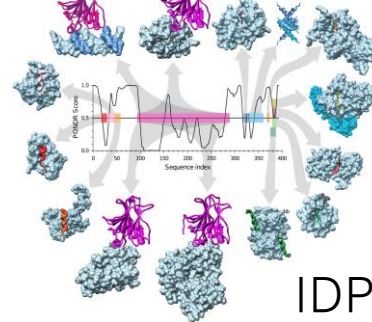
LH1-RC complex & HiPIP

Protein related to  
Proton transfer



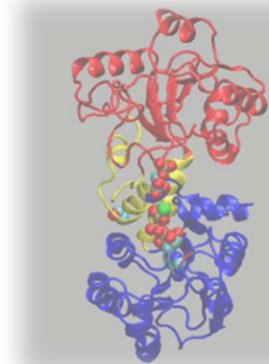
Cytochrome c

Drug  
development



IDP

Target protein for new drug  
Mechanism for  
anticancer



Slow dynamics in protein  
(long wave neutron)

# Top Science @TS2(2)

High brilliant neutron/muon (polarization, parallelization, new detector)

(complimentary use)

Real space science (Inhomogeneous system) → Industry Use

Imaging, Local environment, neutron microscope, muon microscope

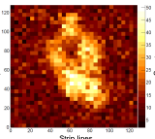
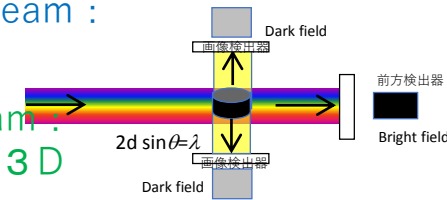
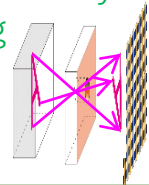
## Imaging Technology

Suppression of neutron beam divergence



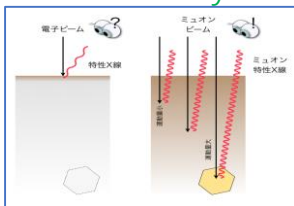
Parallel neutron beam : Use of Diffraction

Negative muon beam : Element analytical 3D imaging

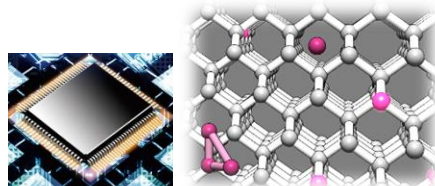


数ミクロンの分解能 干渉/偏極解析を利用した高感度測定

local environment muonic X ray

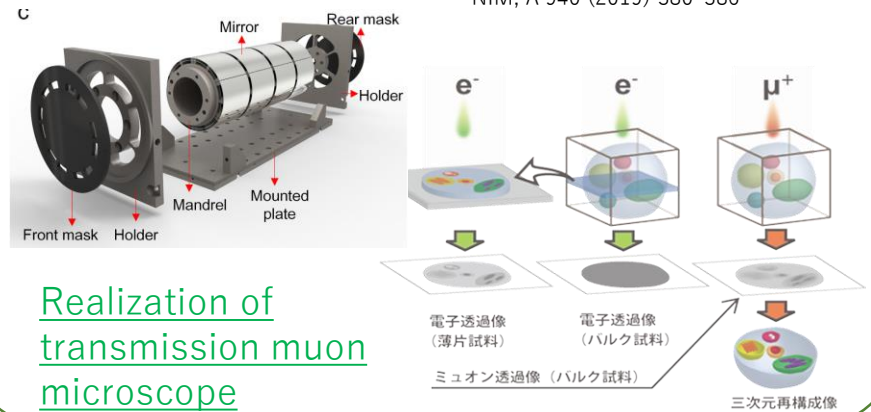


Neutron holography



## Realization neutron microscope (image formation)

NIM, A 940 (2019) 380-386



Realization of transmission muon microscope

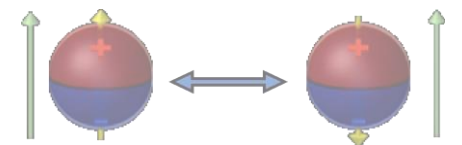
## Industrial application



Visualization : Structure, Stress, magnetization

<http://www.tyoto.co.jp>

Fundamental Neutron EDM Muon EDM etc.



Contribution to human life : Energy, low-carbon society, overcome disease, etc.

# MLF TS2 Construction Schedule

