

Neutron Beamline Design of a White Neutron Source at CSNS

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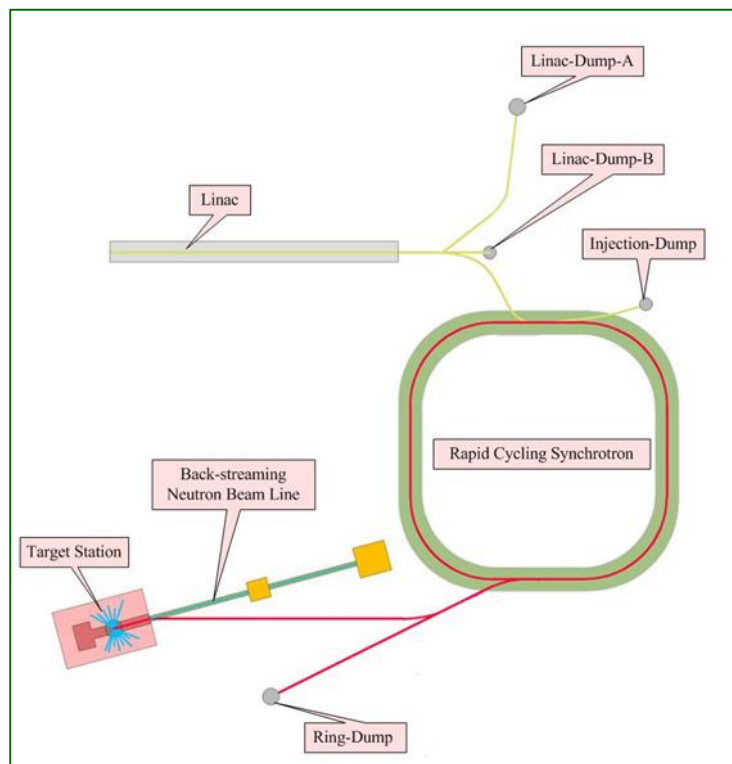


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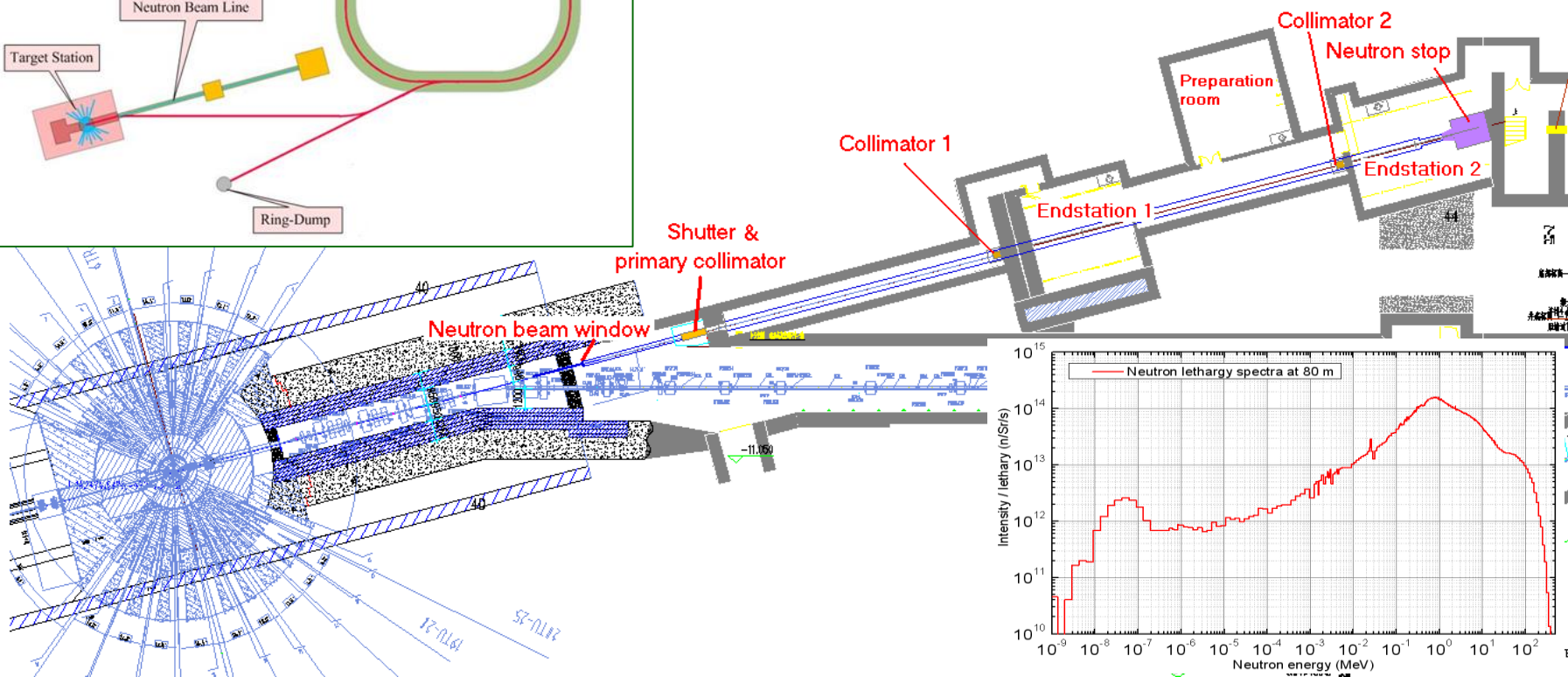
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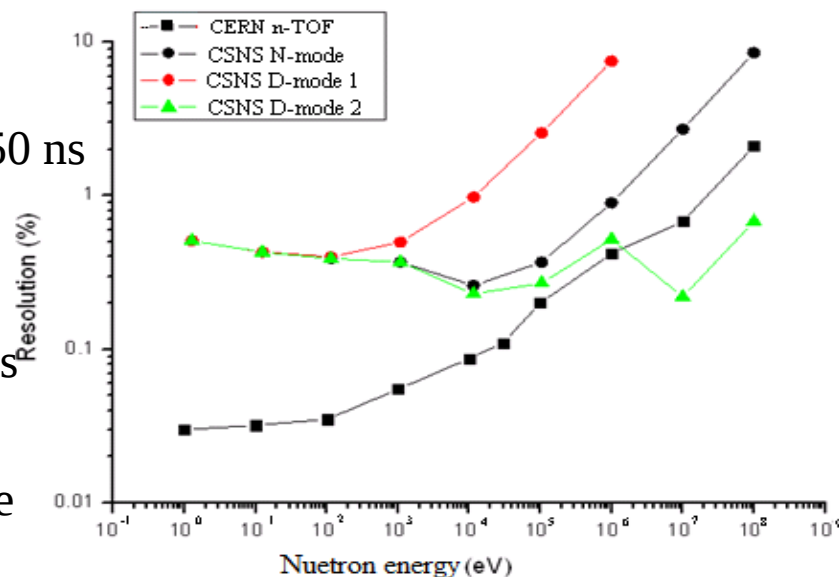
Layouts of CSNS-I complex and back-streaming (Back-n) white neutron source

- 1.6 GeV proton beam on tungsten target
- About 80-m neutron beam line
- Neutron energy range: 1 eV-150 MeV



Back-n operation modes

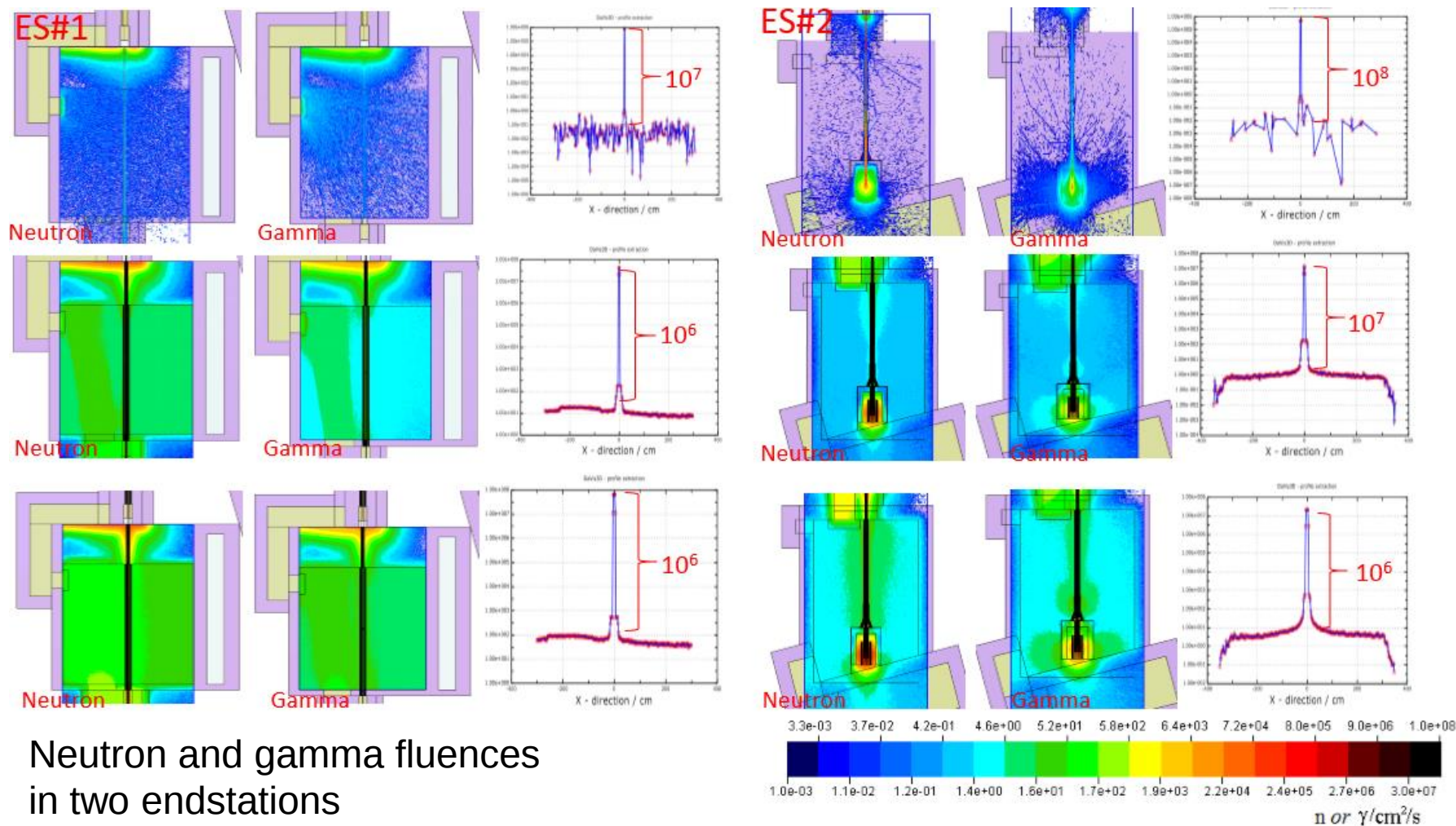
- Normal mode (CSNS normal operation mode)
 - two bunches per pulse, proton rms pulse length: 350 ns
- Dedicated WNS modes (limited period per year)
 - D-Mode 1: 50% nominal power ,
one bunch per pulse, proton rms pulse length: 45 ns
 - D-Mode 2: : 30% nominal power,
proton bunch down to 3.7 ns, single pulse per pulse



Optimization of the shutter and collimators

ES2 spot (mm)	Shutter (mm)	Coll#1 (mm)	Coll#2 (mm)	ES1 spot (mm)	ES1 flux (/cm ² /s)	ES2 flux (/cm ² /s)	Possible experiments
Φ20	Φ3	Φ15	Φ40	Φ15	1.27E5	4.58E4	Low flux exp.
Φ30	Φ12	Φ15	Φ40	Φ20	2.20E6	7.81E5	(n, γ), (n, n'γ), (n, 2nγ)
Φ60	Φ50	Φ50	Φ58	Φ50	4.33E7	1.36E7	(n, t), (n, f), (n, lcp), PFNS
90×90	78×62	76×76	90×90	75×50	5.98E7	2.18E7	neutron radiography

Background simulations for two experimental halls



Neutron and gamma fluences
in two endstations

Civil-engineering progress of the CSNS and Back-n



The first neutron will be obtained in July 2017 !