Existing (Japan)

Name	Type	Primary Particles	Reaction	Intensity	Moderator	Application
HUNS (Hokkaido University Neutron Source)	Linac	Electrons energy: 35MeV, current 30 μA single-100 Hz (Usually up to 50Hz)	Photoproduction	1.6×10^{12} n/sec @ 35 MeV and 1kW	Water thermal moderator and coupled methane moderator	Imaging, SANS, device development, nuclear data
RIKEN Accelerator-driven Neutron Source (RANS)	proton Linac	Protons peak current:10mA average current: 100uA Pulse width:30-200μsec frequency 20–200 Hz duty 1%	Be(p,n)	10^{12}n/s (100uA, 7MeV by simulated)	thermal, polyethylene (1st phase) cold, mesitylene (2nd phase)	thermal: imaging, detector development cold: SANS, pulse imaging
Kyoto Univ. Accelerator-driven Neutron Source (KUANS)	proton Linac	Proton peak current: 10mA , average current: 101μA Pulse width: 30-200μsec repetition 20 - 200Hz duty 1%	Be(p,n)	10^{11}n/s (100uA, 3.5MeV by simulated)	thermal, polyethylene	imaging, detector development, education
J-PARC	Proton synchrotron	Protons Energy: 3 GeV 333 μA Repetition 25 Hz	spallation	3-5x10^{16} n/s	Liquid hydrogen	Diffraction, spectroscopy, spin-echo, imaging.

Existing （out of Japan)

Name	Type	Primary Particles	Reaction	Intensity	Moderator	Application
Compact Pulsed Hadron Source (CPHS)	proton Linac	Protons energy: 3 MeV (stage 1) / 13MeV(stage 2), peak current: 50 mA, average current: 1.25mA pulse duration: 500μs, frequency: 50Hz,	Be(p, n)	~5×10^{13}n/s (1.25mA, 13MeV, by simulated)	Thermal, Polythene (stage 1); Cold, solid methane (stage 2)	SANS(BL1), neutron instrument development (BL2), imaging(BL3), detector development(BL4)
PKUNIFTY (Peking University Neutron Imaging Facility)	RFQ linac	Deuteron, Energy: 2 MeV, Peak current: 40 mA Average current: 400 μA Pulse width: 0.2-1 ms Frequency:100 Hz	Be(d, n)	3×10^{12} n/s @ average current of 4 mA (simultion) 3×10^{11} n/s @ average current of 0.4 mA (current experiments)	polyethylene and light water	imaging, education
GELINA	Van Der Graaf	protons, alpha and lithium. ΔV: 7 MV max cw current: 30 μA pulse width < 1 ns frequency: multiple of 330 ns	Li7(p,n)Be7	3´10e8 n/s @ 2 MeV and 30 μA	none. the neutron spectra is shaped by shaping the proton energy spectra	nuclear astrophysics, neutron activation, validation of nuclear data, next generation reactors data
LENS (Low Energy Neutron Source)	RFQ + 2 LINAC Sections	Protons, Energy: 13 MeV, Peak current: 25 mA (peak) (current) pulse width 0.015–0.6 ms frequency 20 Hz Planned paameters Energy: 18 MeV Peak current: 100 mA Pulse width: 0.015-2.0 ms Frequency: 20 Hz	Be(p, n)	Target station 1 – 3 x10^{11} n//s current. 5 x 10^{12} n/s (planned) Target station 2 – ~10^{13} n/s (current), ~5x10^{13} n/s (planned)	Target Station 1 User selectable – None, water, poly without light water reflector. Target Station 2 Solid methane at 4K with light water reflector	Target Station 1 Radiation effects – commercial and military electronics testing Neutron imaging (radiography and tomography) – geology, antropology, art Target Station 2 SANS – geology, materials science, biophysics Spin polarized reflectometer – biophysics, polymers Test Beam Line – detector and optics development, moderator research

Main accelerator driven neutron source in Europe

Name	Type	Primary Particles	Reaction	Intensity	Moderator	Application
ISIS Spallation Neutron Source UK http://www.isis.stfc.ac.uk/	proton Synchrotron	proton, energy: 800 MeV Average current: 200μA, pulse duration: two bunches 100 ns width and 200 ns apart frequency: 40Hz for TS-I and 10 hz for TS-II Target: W/Ta	spallation	~10^{16}n/s (estimated)	Water Methane (solid) Liquid hydrogen	Diffraction Quasi Elastic scatterjng spectroscopy Small Angle reflectometry
SINQ @ PSI Swizterland http://www.psi.ch/sinq/	cyclotron	proton energy: 590 MeV Current: 1 mA frequency;. Continuous Target: lead rods Envisaged rotating euthectic lead-bismuth (MEGAPIE project, successful test in 2006) to improve by 80% the neutron flux	spallation	3x10^{16} n/s	Heavy water Liquid deuterium	Diffraction Small Angle Scattering Spectroscopy Raadiography Imaging reflectometry
Frascati Neutron Generator ENEA-Frascati	Deuteron Linear Accelerator	Deuterons Deuteron energy: 260 keV Current: 1 mA Target: deuterium or tritium Frequency: continuous	$D(d,n)^3He$ or $T(d,n)\alpha$	D-D reaction 10^9 n/s @ 2.5 MeV D-T reaction 10^{11} n/s @ 14 MeV	The monochromatic beams at 2.5 and 14 MeV can be moderated by movable moderation systems to obtain thermal neutrons fpr specific measurements	Benchmark experiments Activation cross sections measurements, fast neutron activation analysis, detector development
GELINA Belgium http://irmm.jrc.ec.europa.eu/about_IRMM/laboratories/Pages/gelina_neutron_time_of_flight_facility.aspx	Electron LINAC	Electron energy: 100 MeV Average current: 100 μA Frequency: 800 Hz Pulse width: 1 ns Target: uranium	Photoproduction	3.4 x 10^{13} n/s	Both moderated and non moderated beams	NRCA Neutron data Nuclear structure

The Spallation Neutron Source in US

Name	Type	Primary Particles	Reaction	Intensity	Moderator	Application
Spallation Neutron Source* USA http://www.bnl.gov/cad/sns/	proton Synchrotron	proton, energy: 1 GeV Average current: 2 mA, pulse duration: 695 ns frequency: 60Hz, Target: rotating liquid Hg	spallation	~10^{17}n/s (estimated)	Water Methane (solid) Liquid hydrogen	Diffraction spectroscopy Small Angle reflectometry

* Parameters from SNS design: present performances possibly reduced due to target problems