Neutrons at NIST

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NIST

Promoting U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

NIST LABORATORIES

Physical Measurements Laboratory

Material Measurements Laboratory

Engineering Laboratory

Information Technology Laboratory

Communication Technology Laboratory

Center for Nanoscale Science and Technology

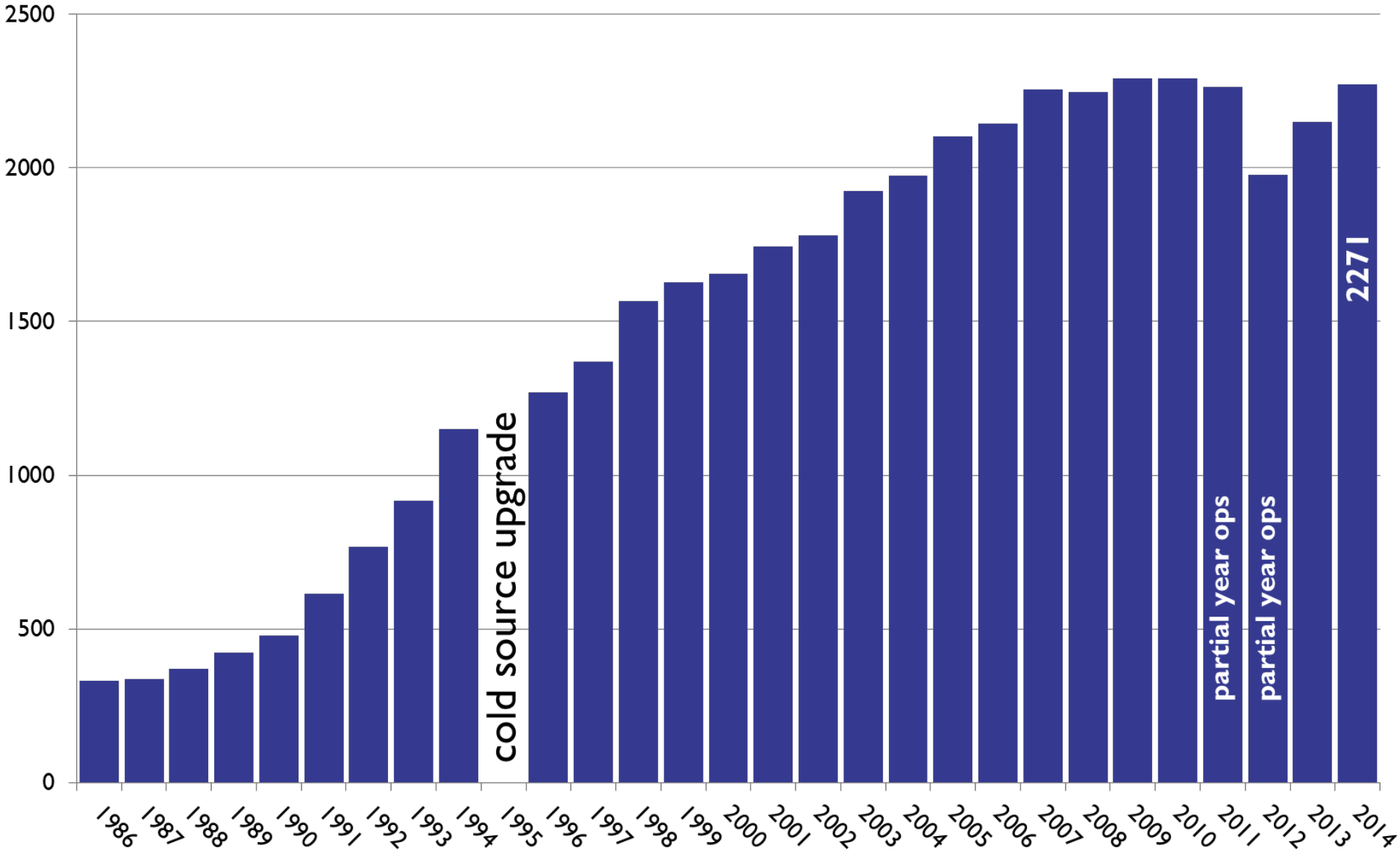
NCNR

MEASUREMENT LABORATORIES

TECHNOLOGY LABORATORIES

USER FACILITIES

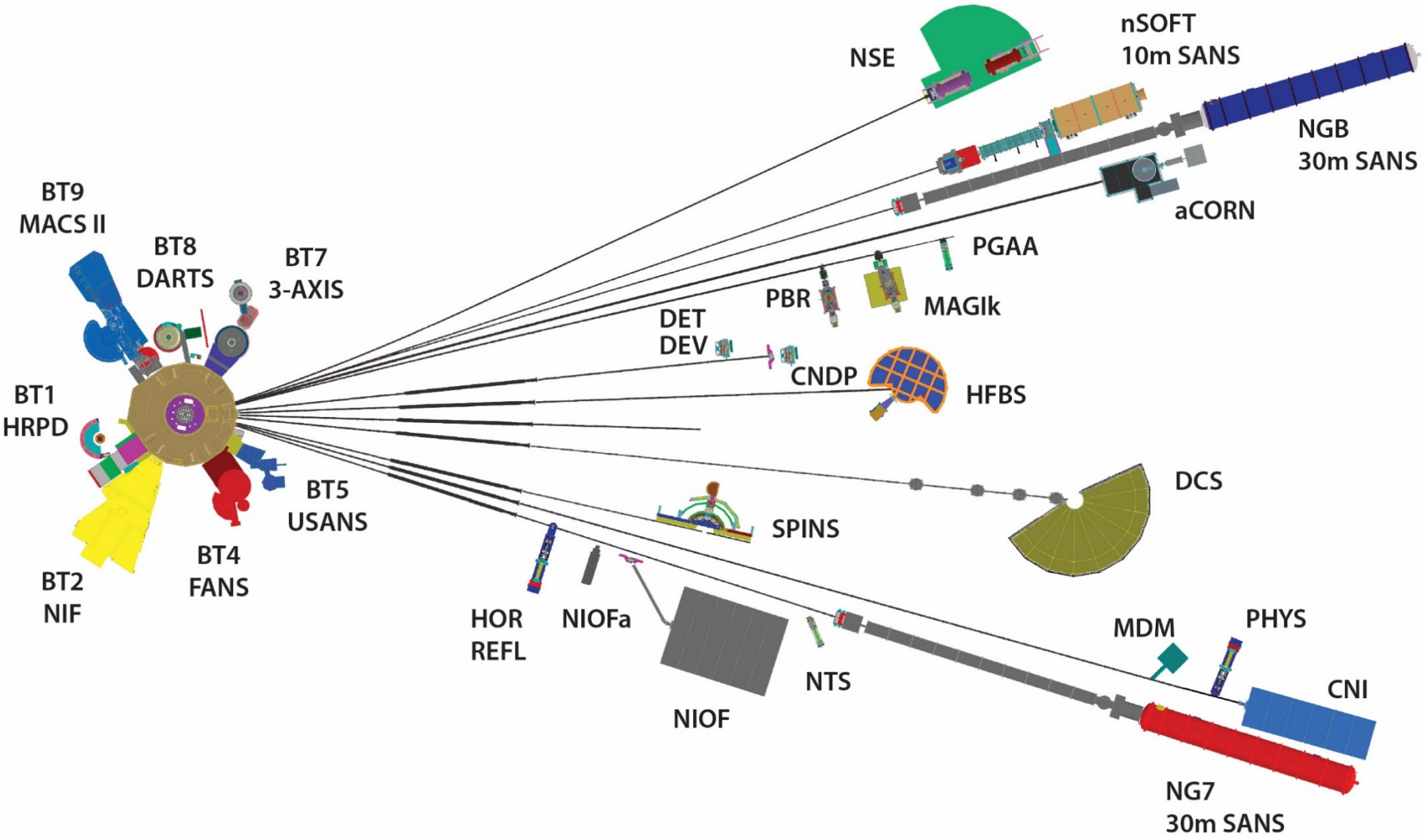
NCNR Research Participants



28 instruments

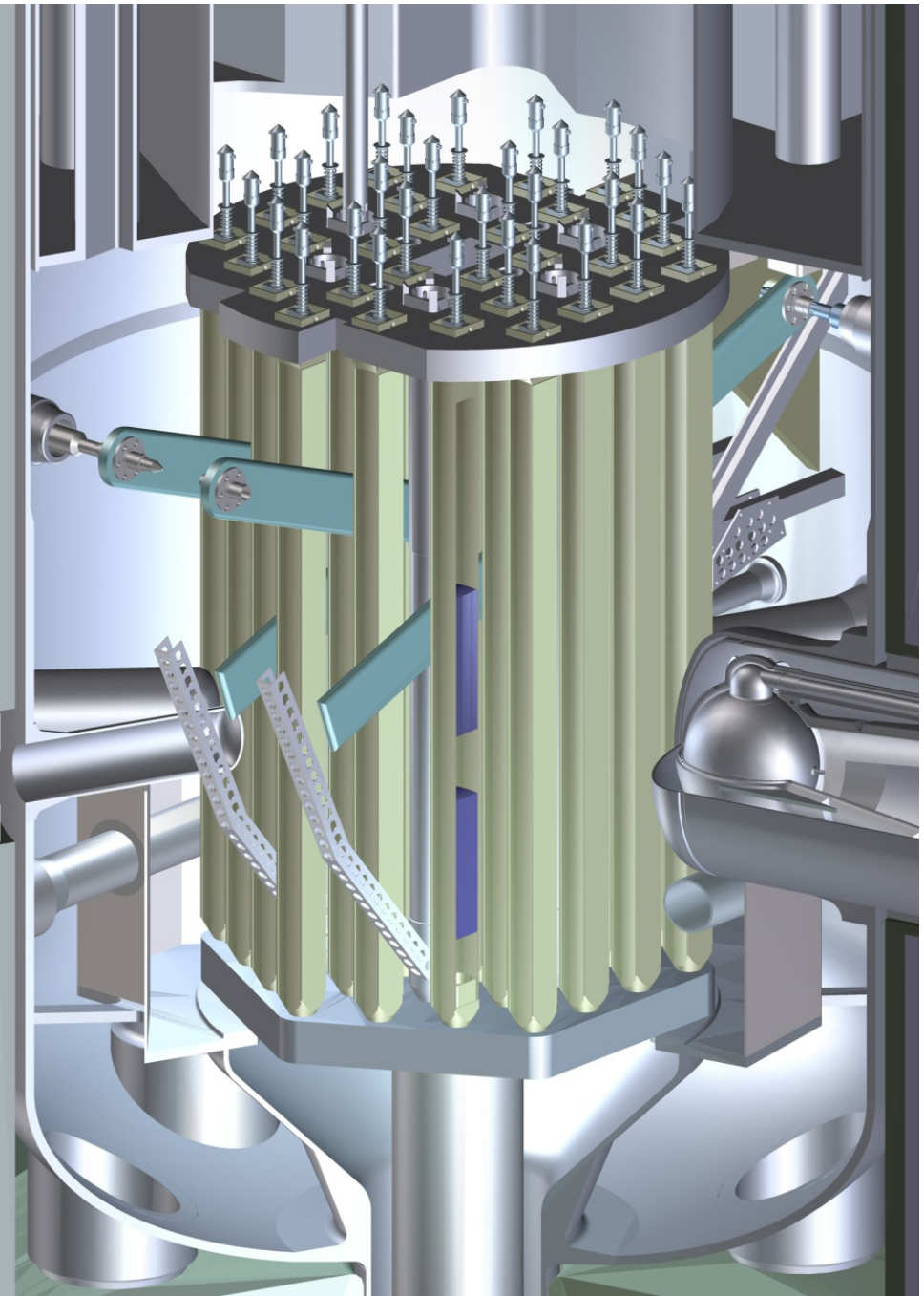
250 operating days

2 proposal calls/year



Unique instruments to address the needs of the scientific community

NEUTRON PRODUCTION



20 MW
D_2O moderated
30 fuel elements

$$\Phi = 1.5 \times 10^{14}\ \mathrm{n/cm^2/s}$$

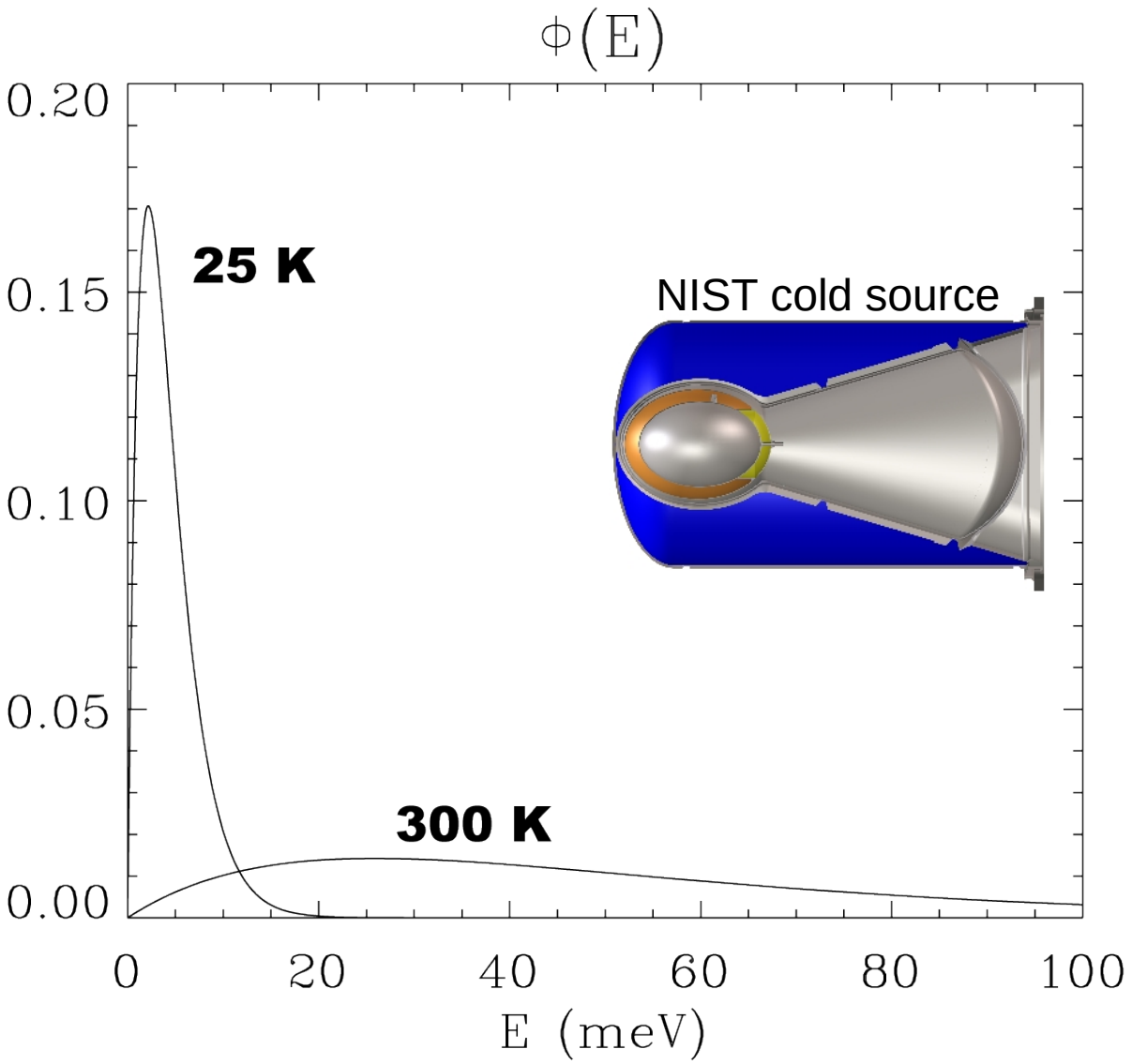
at mid-plane
(un-fueled region)

7 cycles/year
38 day cycles
~250 days/year

Licensed through

2029

COLD NEUTRON PRODUCTION



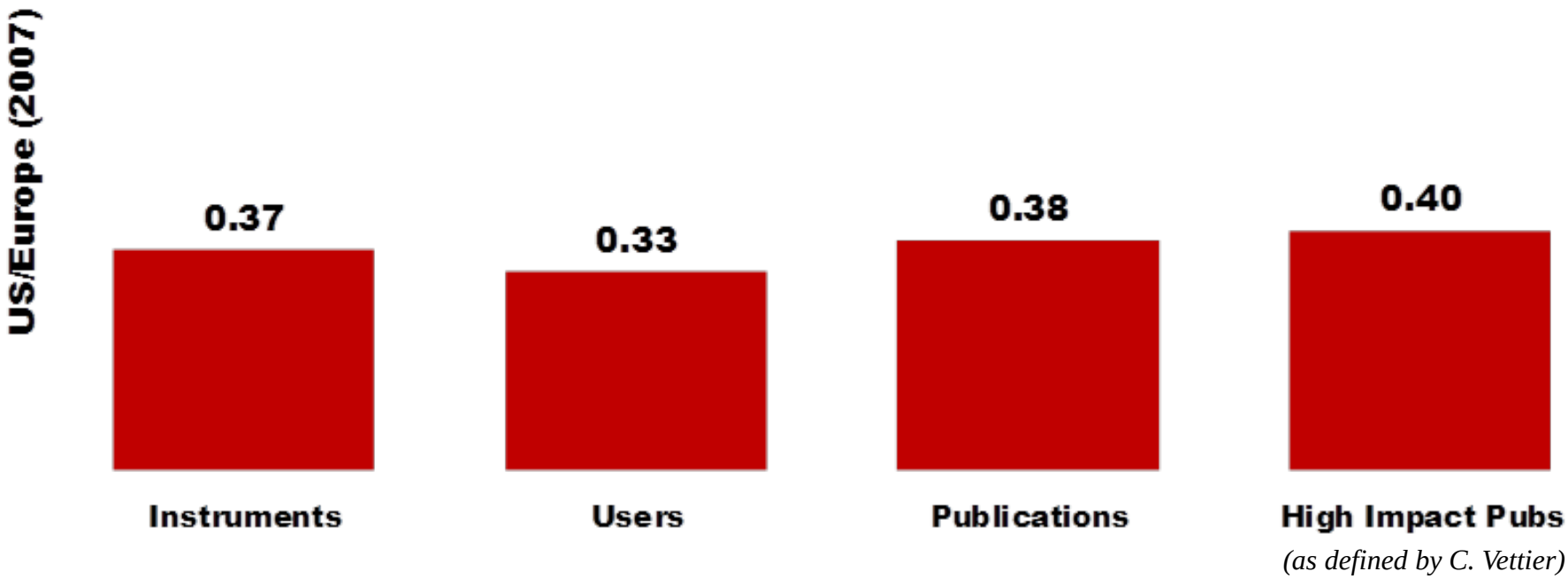
Cold neutrons (long λ, small E) are well-suited for probing structure and dynamics of soft matter such as polymers and biomolecules.

Unit 2 CS serves 12 guides

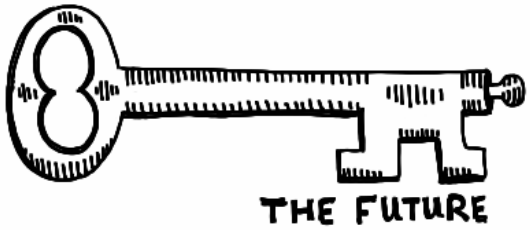
Pee-wee CS serves MACS

NEUTRON USER FACILITIES

The US neutron scattering community is ~35% of that in Europe



The US scientific community would produce more high quality science if it had *more good neutron scattering instruments*.



Safe, reliable, good source of thermal & cold neutrons

Replaced secondary cooling system
Added capacity via new cooling tower cell
Installed new electrical substation
Upgraded thermal shield cooling system
Instrumentation and control upgrades
Replaced primary storage tank pumps
Installed new cold source for MACS
Spent fuel pool liner upgraded
New emergency backup power systems installed
Control rod supply ("shim arms")

Liquid D_2 cold source
Secure D_2O supply
HEU to LEU conversion

<u>Age management</u>
Control room modernization program
Plant instrumentation
Replace primary pumps
New de-min water supply
Maintenance of all systems, etc…

Good neutron scattering capabilities

VSANS, CANDoR, cold neutron imaging, engineering diffractometer
Instrument development workshop in August 2014
Sample environment
Polarized neutron beam production/analysis

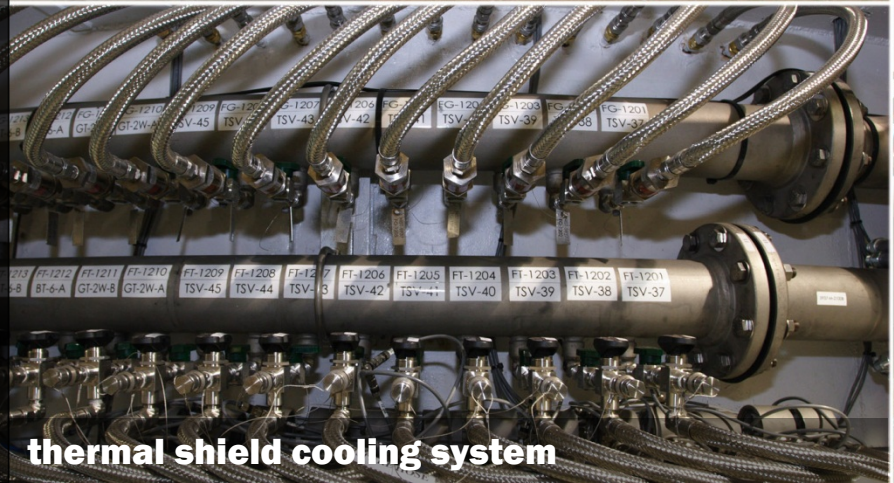
MAJOR REACTOR PROJECTS


secondary cooling pump building


pool liner


electrical substation


cooling tower cell



thermal shield cooling system

Reactor control room modernization

Future Cold Source Layout