

# Canadian Neutron Initiative

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ROUNDTABLE

DECEMBER 15 & 16, 2020

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# Outline

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## Neutron irradiation needs in Canada

- Past
- Present
- Future



Past: Nuclear Research Universal Reactor (1957 – 2018)

# NRU's Accomplishments

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A multipurpose reactor

- radiosotopes,
- neutron source for NRC Canadian Neutron Beam Centre and
- AECL's test bed to develop fuel and materials for CANDU reactors

The fundamental knowledge gained in the NRU enabled the development of the CANDU reactor, which is the foundation of the Canadian Nuclear Industry.



Past: Halden Boiling Water Reactor (1958 – 2018)

# Halden's Accomplishments

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A multipurpose reactor

- safety-focused research into materials,
- fuel burnup and
- fuel behaviour in prolonged operating conditions

Operated in co-operation with organizations from 19 countries.



Present: High Flux Isotope Reactor (1965 - )

# HFIR's Accomplishments

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- One of the highest flux reactor-based sources of neutrons for Condensed Matter Physics research
- It provides one of the highest steady-state neutron fluxes of any research reactor in the world
- It is used to study physics, chemistry, materials science, engineering and biology

The intense neutron flux, constant power density and constant-length fuel cycles are used by more than 500 researchers each year for neutron scattering research into the fundamental properties of condensed matter



# The Future

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- Industry is concerned about the lack of Canadian multipurpose neutron sources for irradiation of materials
- New developments (IP) may be stalled
- Several non-CANDU Small Modular Reactors are coming
- A neutron source in Canada is needed for the next decades
- Second Best / Short Term: Partnerships with other countries

*Thanks!*