Engineering of the thermal moderator for a Compact Accelerator driven Neutron Source (CANS)

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Motivation

Primary neutrons: MeV energy range
Moderator: takes the energy down to the meV range

Moderation process needs time → pulse shape is modified
Convolution of proton pulse length and moderation time

Main parameters:
• Diffusion (dilutes the neutron cloud)
• Scattering (moderation + random walk)
• Absorption (reduces intensity)

Moderator material

PE, H2O/D2O, diluted PE, slightly borated PE

Variation of scattering and absorption for 50, 200, 800 µs

Geometry

Sphere, one plate, 2 plates (only PE)

Variation of diffusion

for 50, 200, 800 µs

Reflector

Be, Pb, MgO, Absorber for PE, D2O/H2O moderator

Variation of diffusion and scattering

for 50, 800 µs