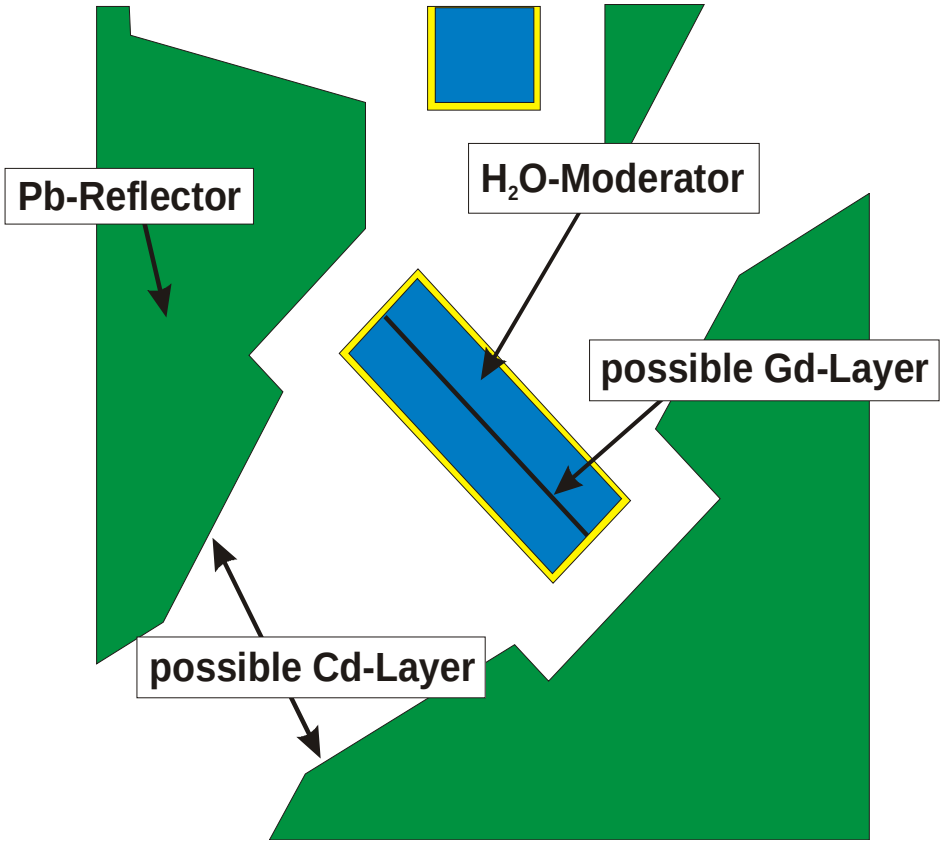
Moderators

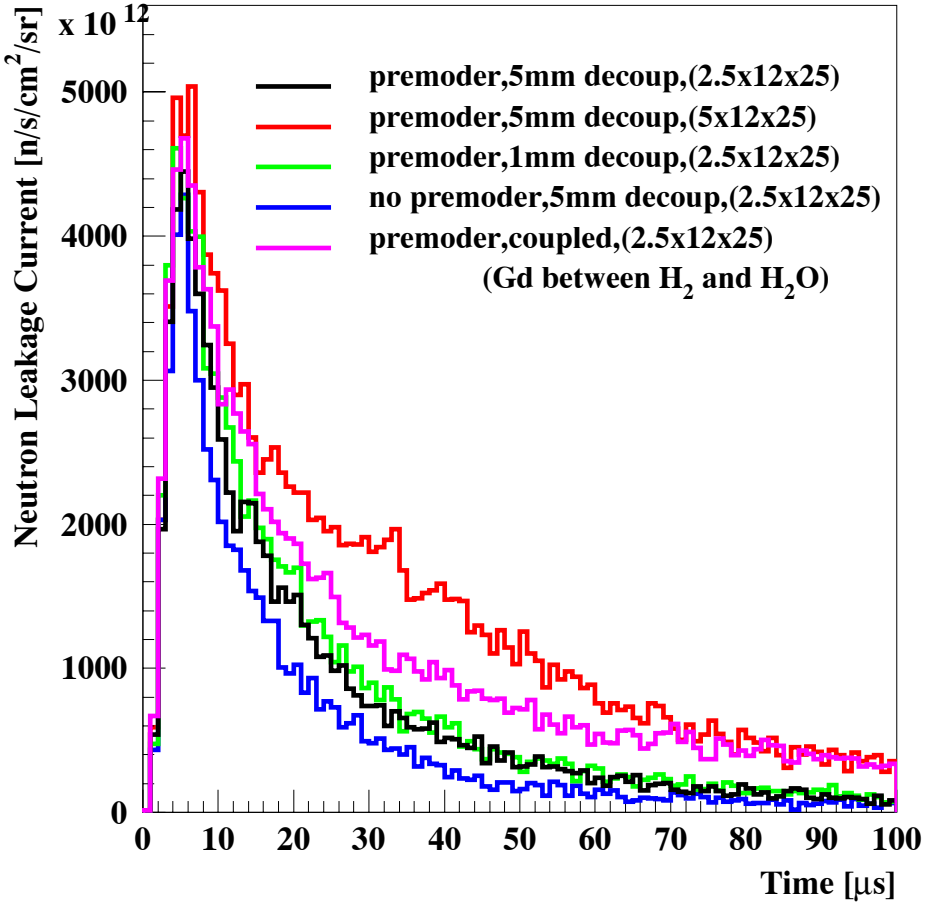
Ambient Temperature Water Moderator (Details)

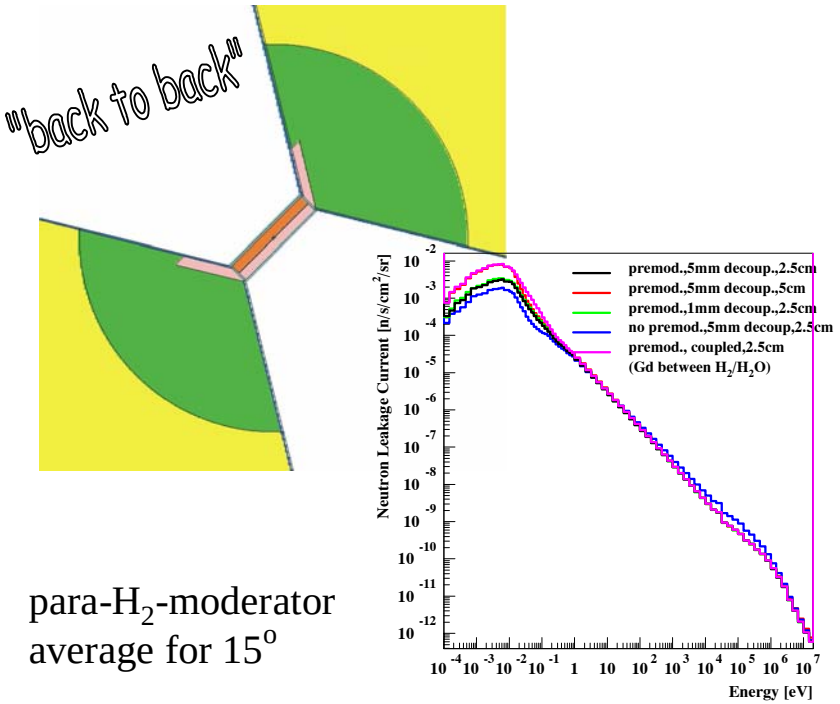


- Position bottom upstream
- midpoint position in 10 cm distance from mercury target beam window
- distance between target surface und moderator: 7cm
- moderator size 15 x 12 x 5 cm^3
- moderator material: water at 300 K
- reflector 100 Vol-% Pb
- poison: 0.5 mm Gd
- de-coupler: 1 mm Cd

Thermal (E≤383meV) neutron leakage current density

effect on coupling





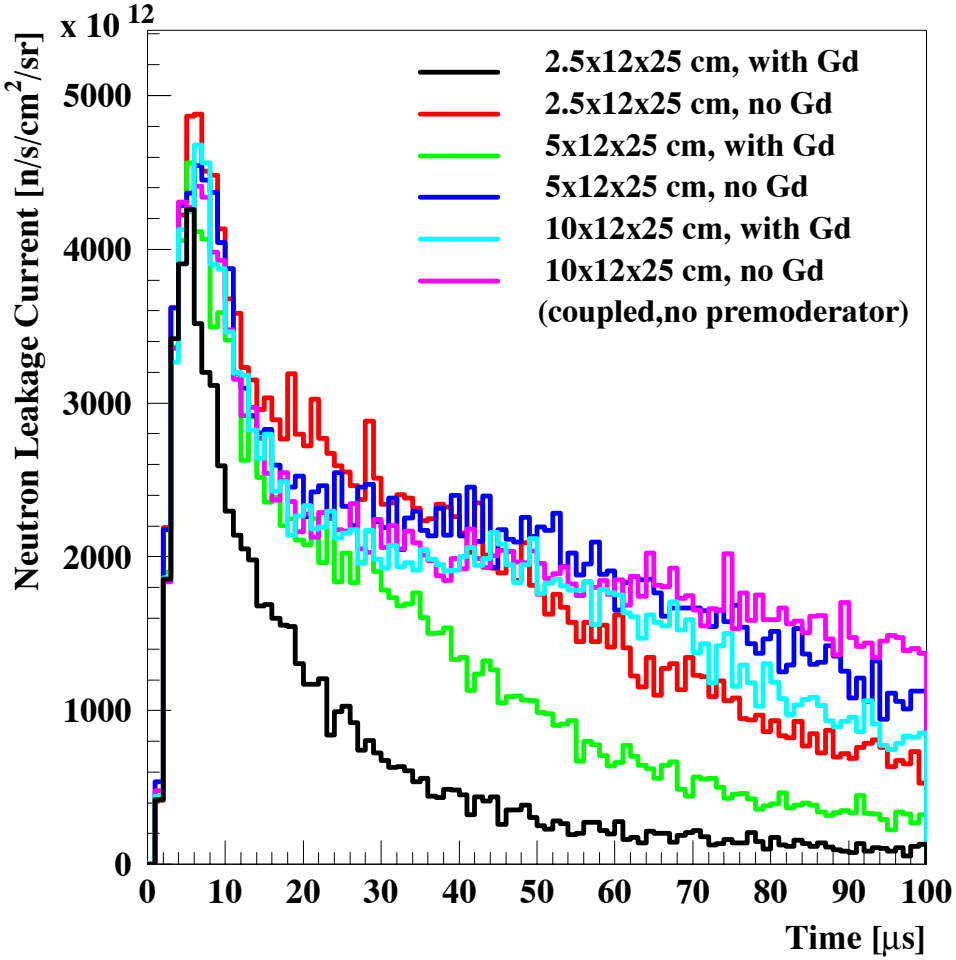
para-H_2-moderator
average for 15°

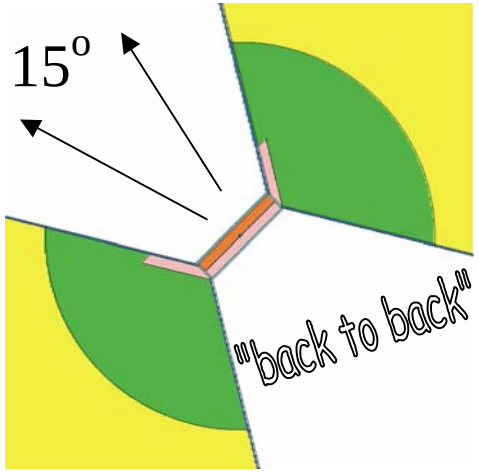
-Slightly higher intensity when coupled
-No substantial change for Cd 1 or 5mm

for 2.5cm:
-no substantial change when premoderated
-increase of peak intensity and pulse width with increase of thickness H_2

Thermal (E≤383meV) neutron leakage current density for H_2 mod.

thickness variation…



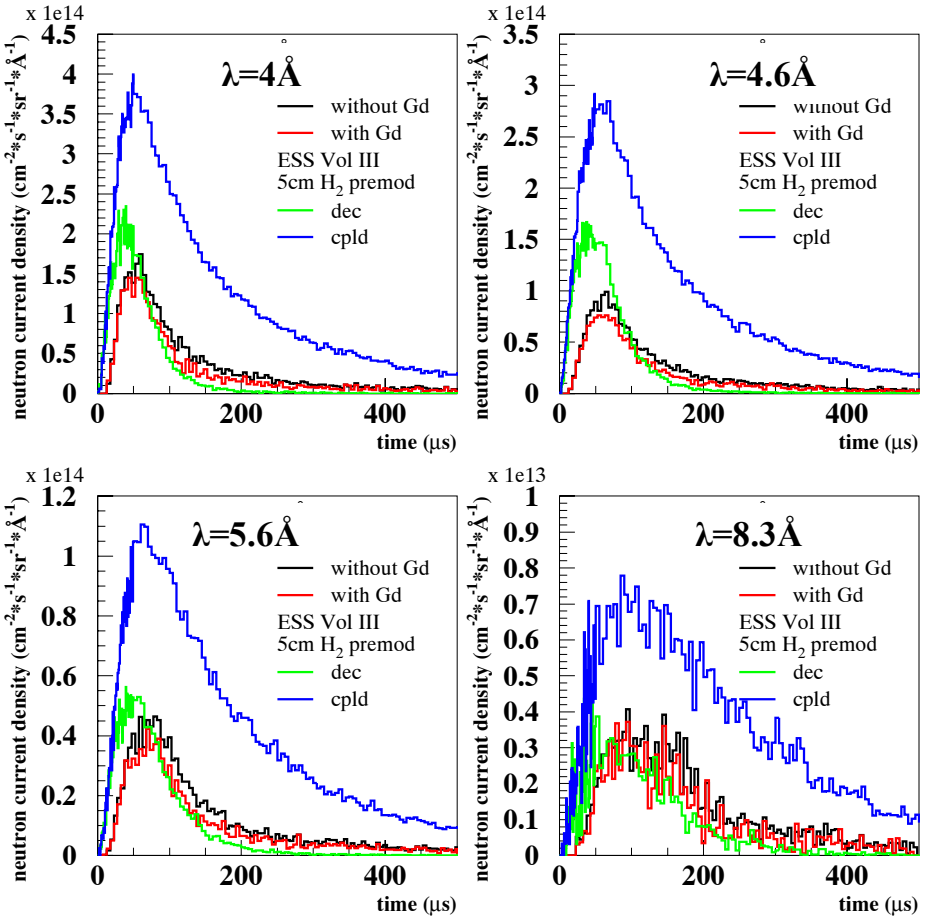


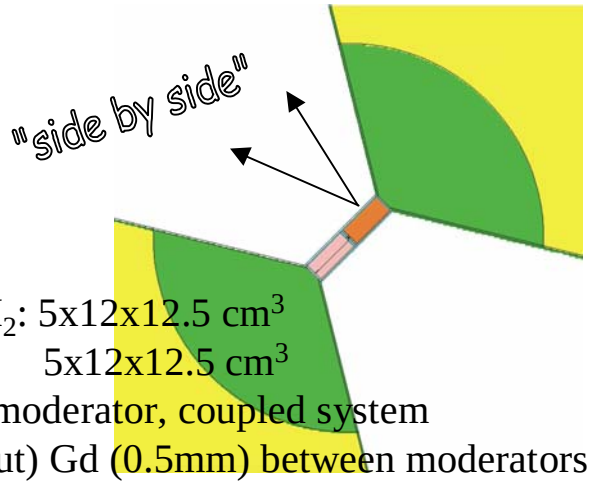
…as a function of thickness of para-H2-moderator …with(out) Gd between H_2/H_2O

average for 15°, adjacent 2.5cm H_2O mod.

- **average for 15°** more than doubles the intensity!

Neutron current density (wavelength dependent), para-H_2



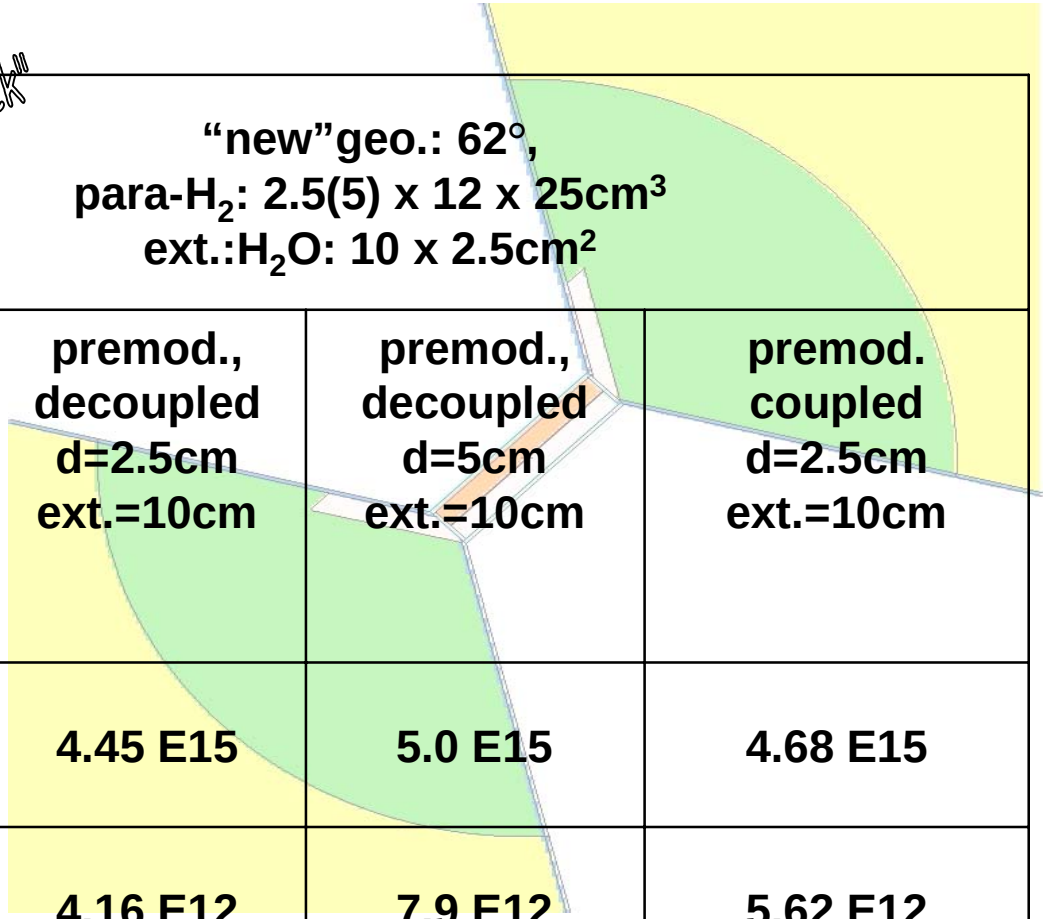


Para-H_2: 5x12x12.5 cm^3
H_2O: 5x12x12.5 cm^3
no premoderator, coupled system
with(out) Gd (0.5mm) between moderators
opening 62°
average for 15°

-app. 10% less intensity when Gd „decoupled“
→since surface between mod. quite small…
→H_2O does NOT work as „premoderator“

comp. to Vol.III coupled and decoupled

Expected values of thermal leakage neutron current densities of SPTS moderators for 5 MW proton beam power



aver. for 15° ad 2.5cm H_2O Gd between H_2O and H_2	"new"geo.: 62°, para-H_2: 2.5(5) x 12 x 25cm^3 ext.:H_2O: 10 x 2.5cm^2			
	Not pre., decoupled d=2.5cm	premod., decoupled d=2.5cm ext.=10cm	premod., decoupled d=5cm ext.=10cm	premod. coupled d=2.5cm ext.=10cm
peak current $\hat{J}$	4.3 E15	4.45 E15	5.0 E15	4.68 E15
mean current <J>	3.1 E12	4.16 E12	7.9 E12	5.62 E12