# Influence of shielding design on muon-induced neutron background

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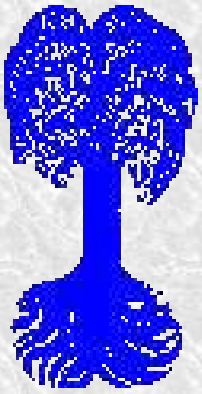
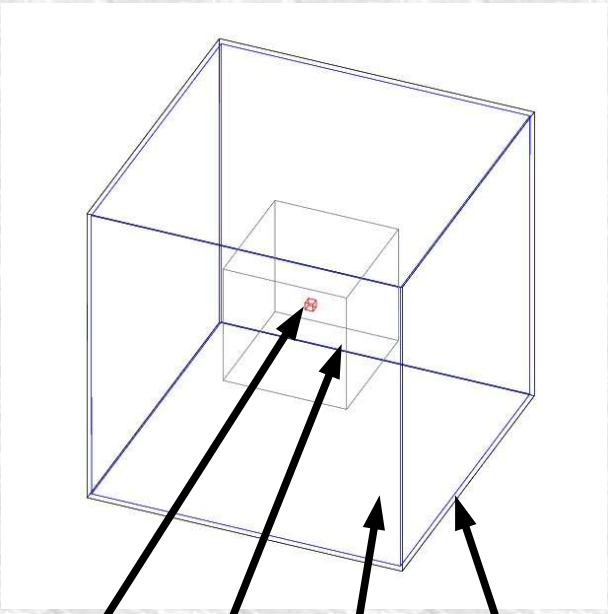


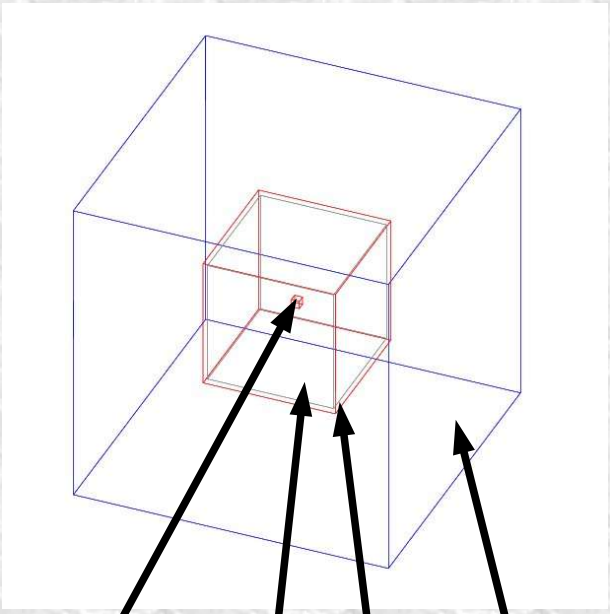
# Muon-induced neutrons

LN2-Water



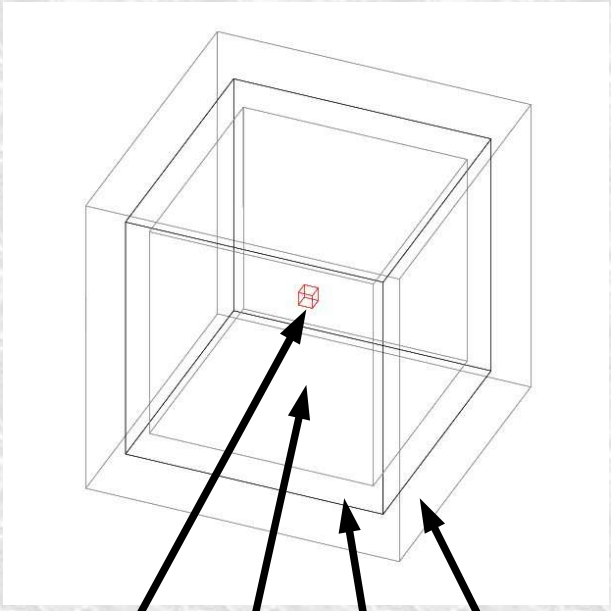
Det. LN2 Water LScint.
1.85 m 3 m 5 cm

LN2-Copper-Water



Det. LN2 Cu Water
1,85m 5 cm 3 m

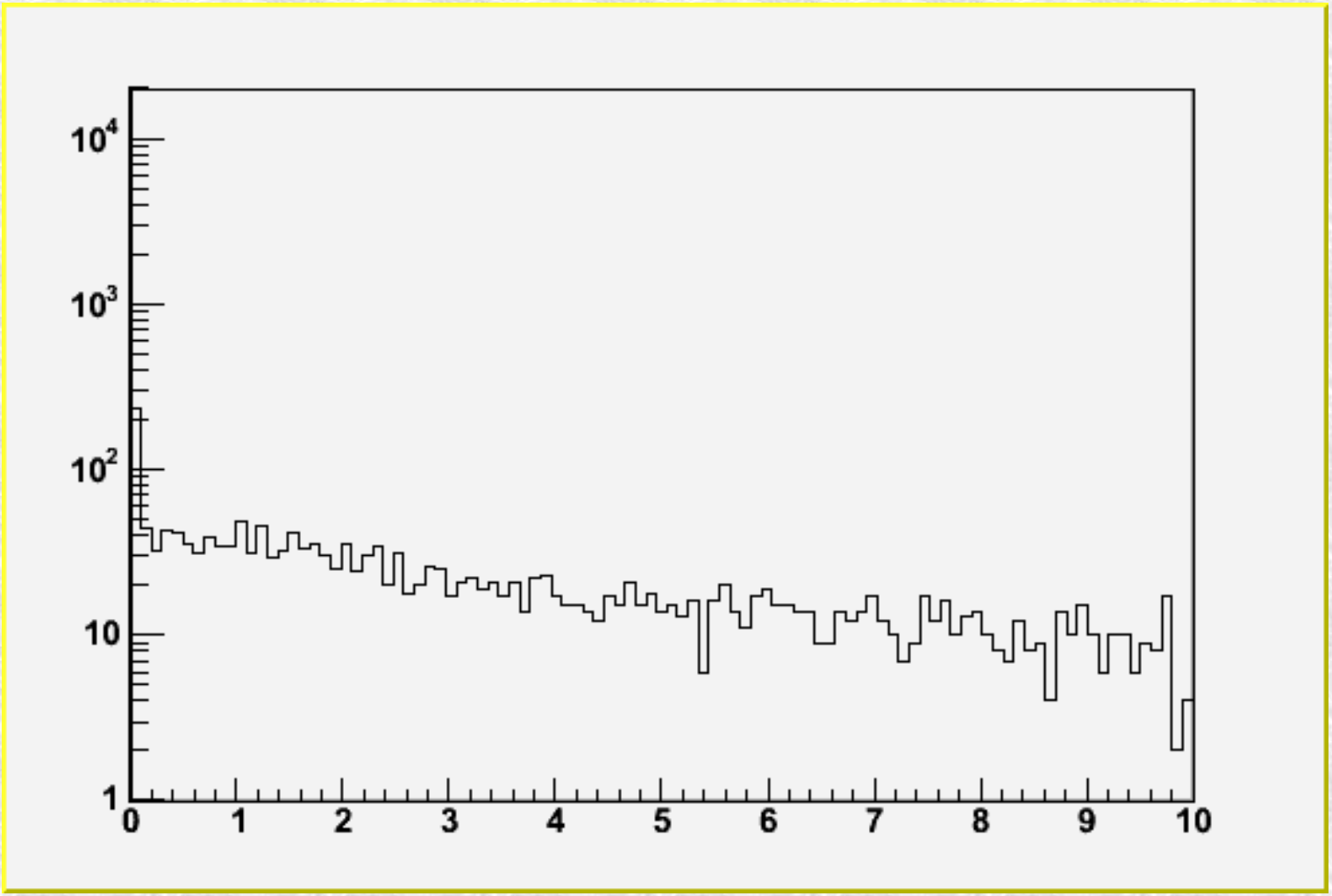
LN2-Lead-PE



Det. LN2 Lead PE
1.85 m 30 cm 50 cm

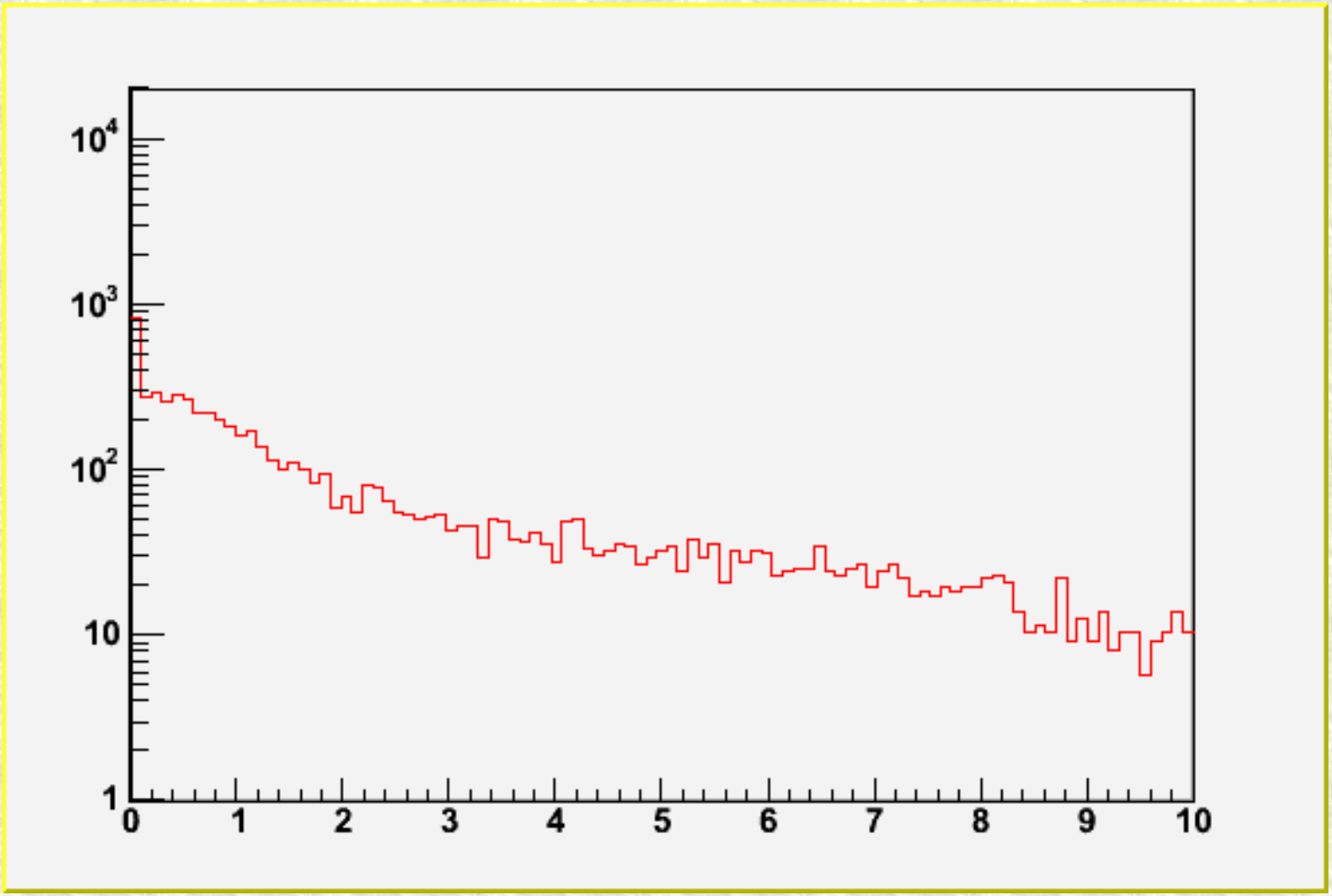
# Results

neutron spectra in liquid nitrogen: LN2-Water



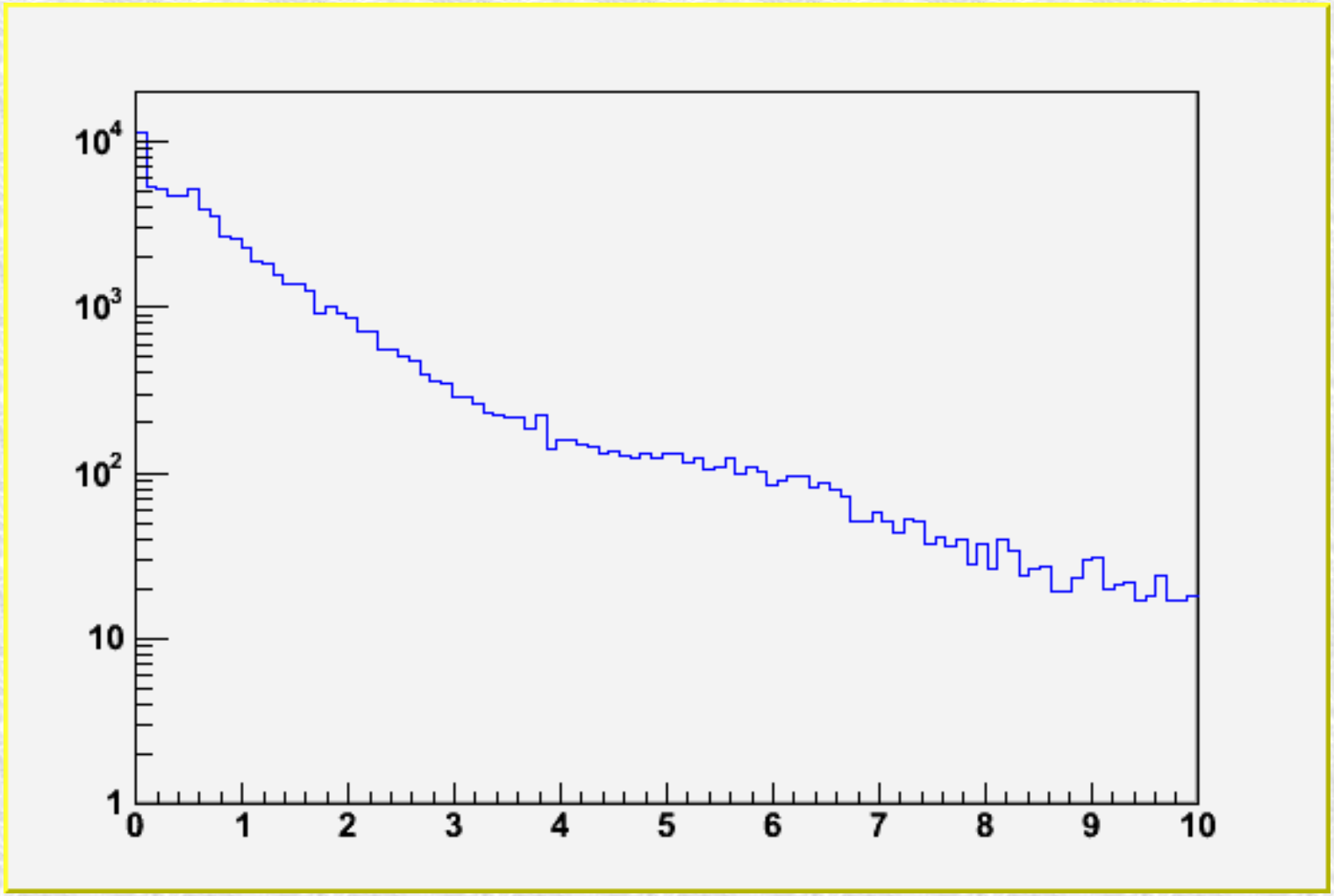
# Results

neutron spectra in liquid nitrogen: LN2-Copper-Water



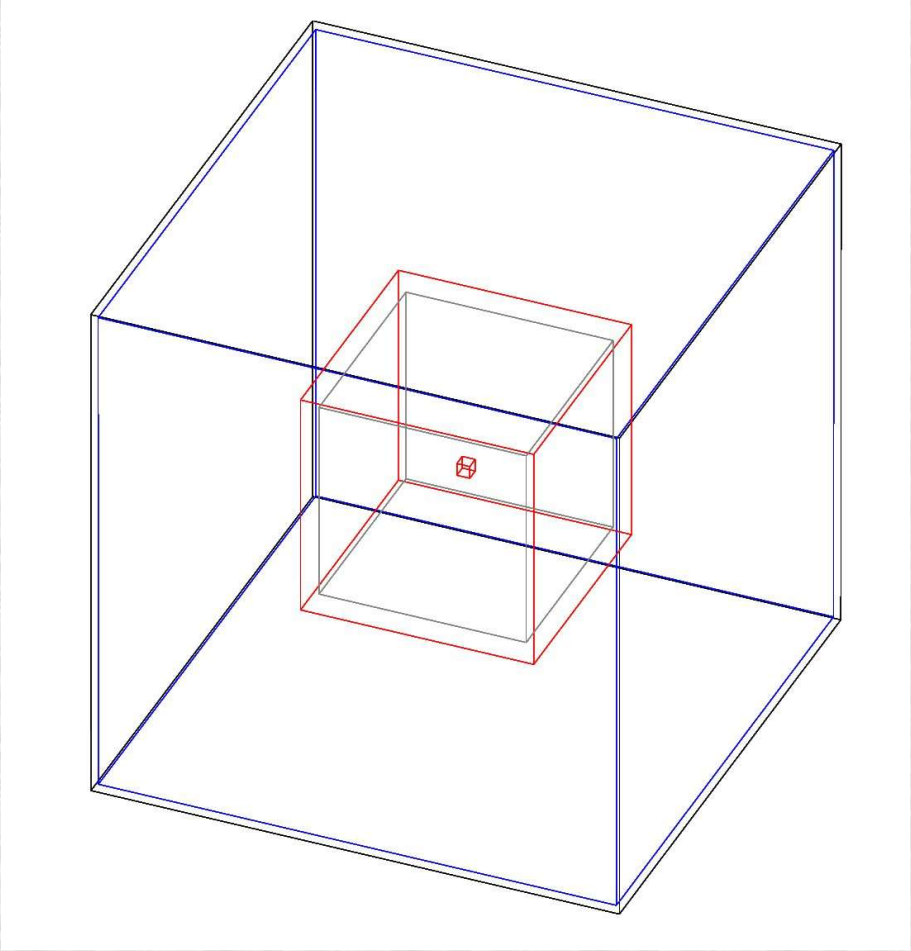
# Results

neutron spectra in liquid nitrogen: LN2-Lead-PE



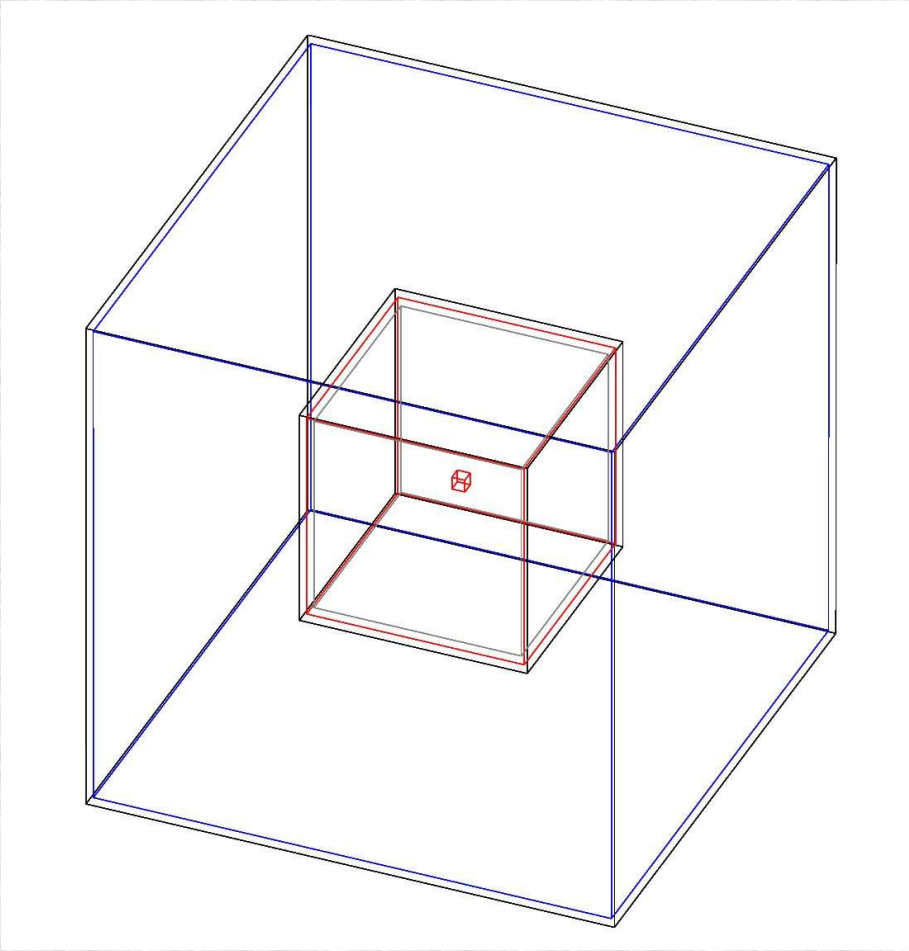
# Studies regarding the 3rd wall

LN2 – 45 mm Copper – Water – Copper



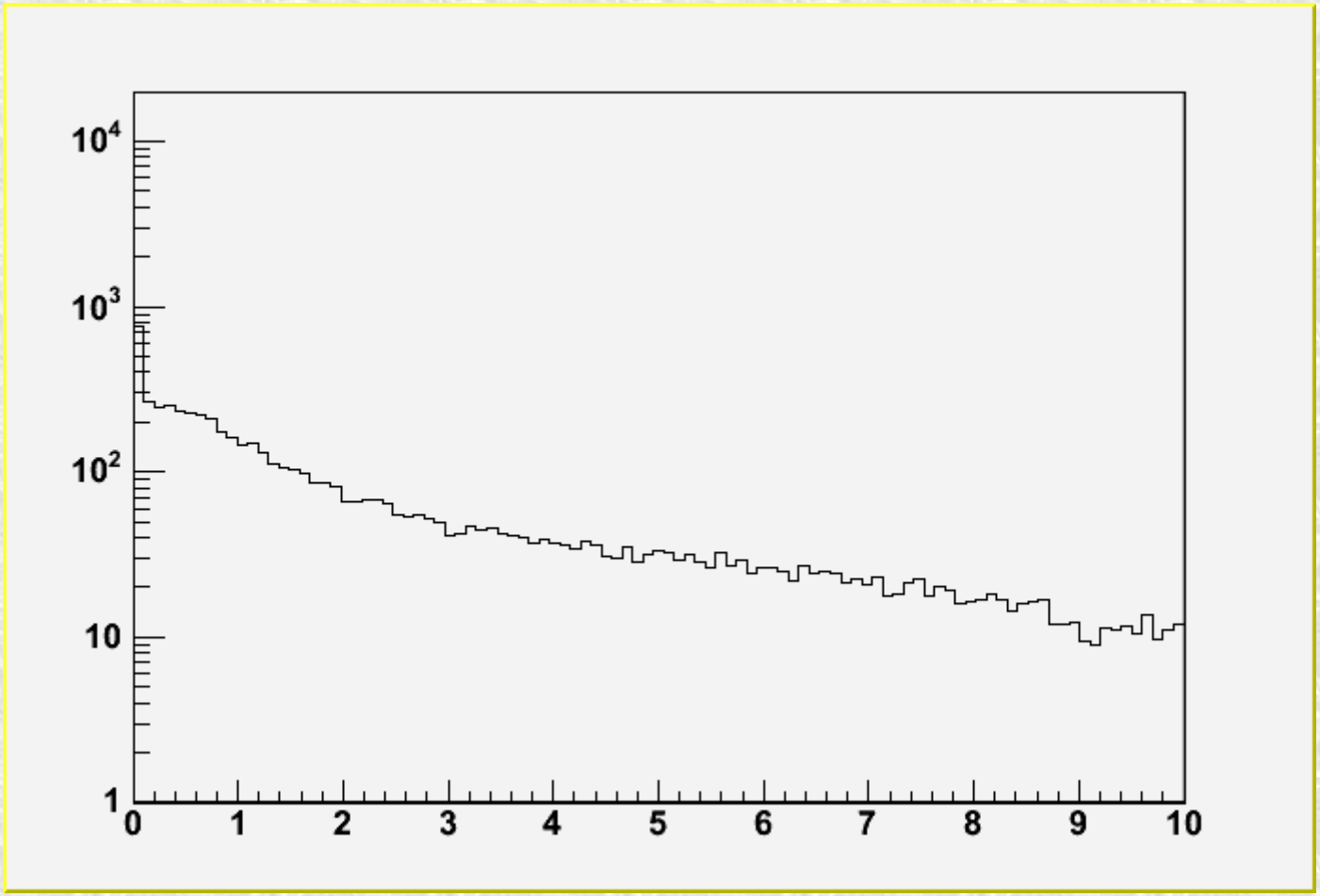
# Studies regarding the 3rd wall

LN2 – 20 mm Cu – 20 mm Lexan – Water – Copper



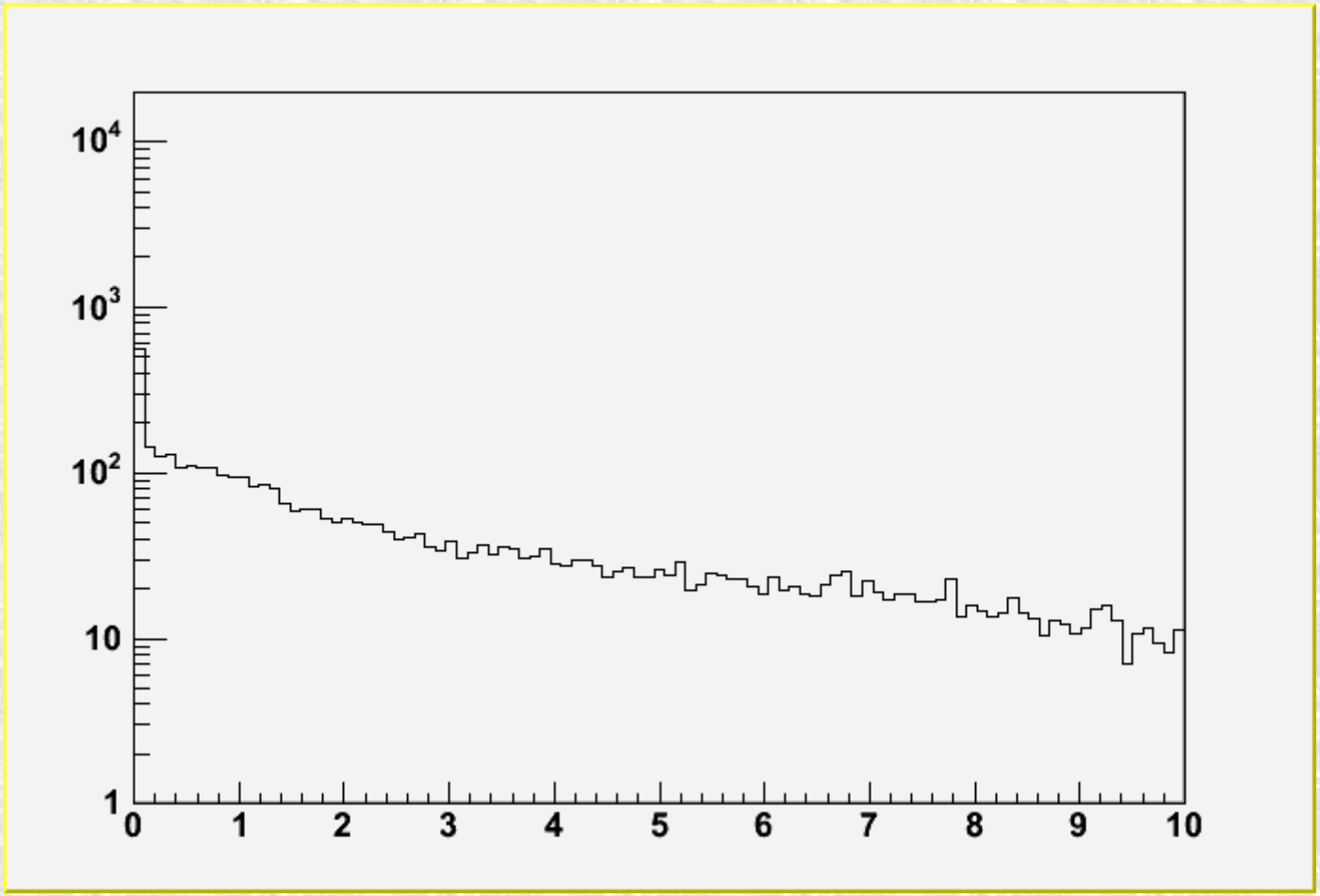
# Results

neutron spectra in liquid nitrogen: LN2-Copper-Water-Copper



# Results

neutron spectra in liquid nitrogen: LN2-Copper-Lexan-Water-Copper



# Summary and Outlook

- Simulations have shown that the shielding design has a influence on the neutron spectra inside
- avoiding high-Z materials really seems to give a advantage
- Lexan wall gives less neutrons below ~ 3 MeV than copper wall
  - factor 2 at 1 MeV, 30% at 3 MeV
  - impact still needs to be studied, but probably no problem for the experiment: flux about $10^{-10}$ / ($cm^2$ s)