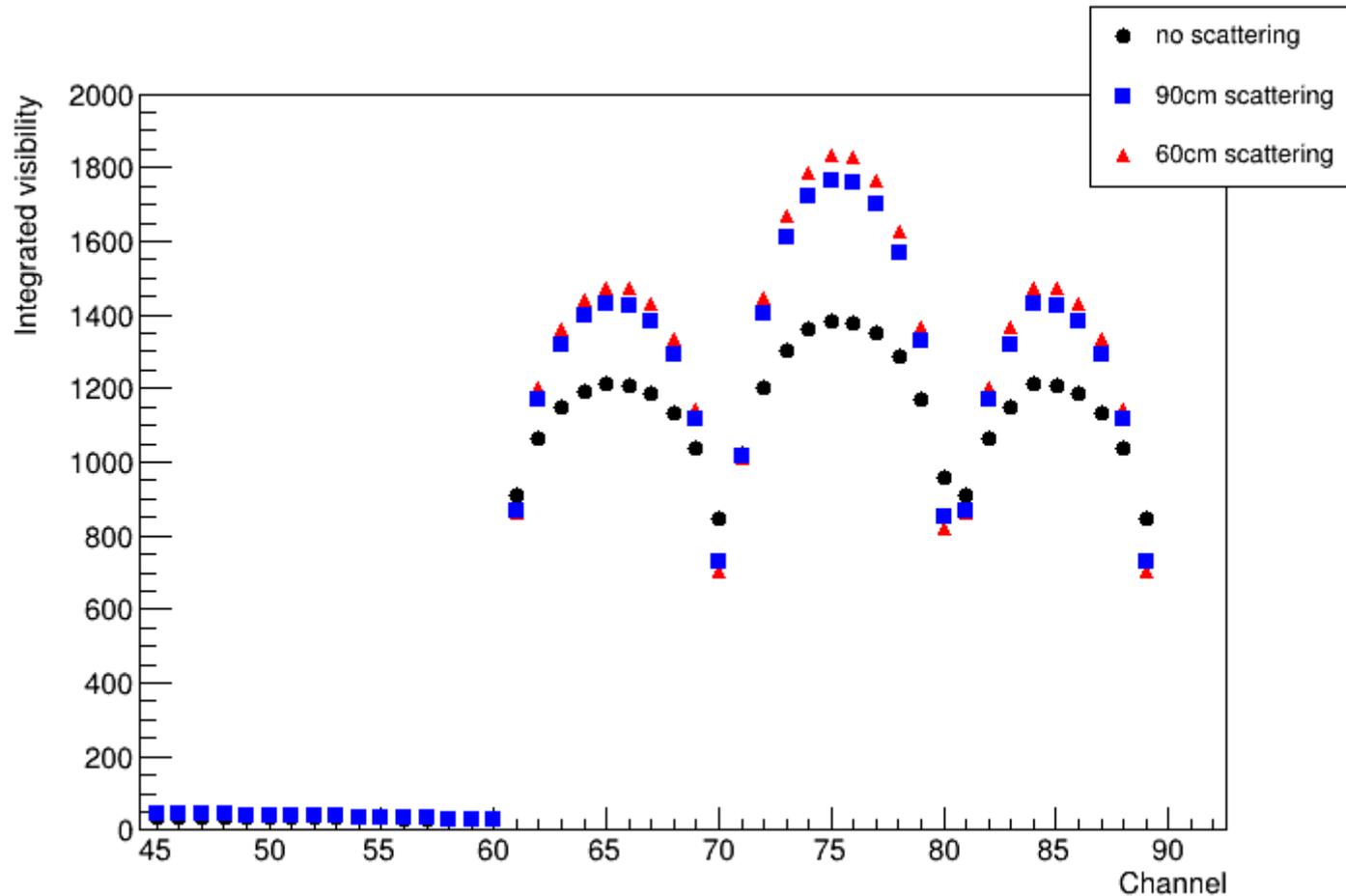


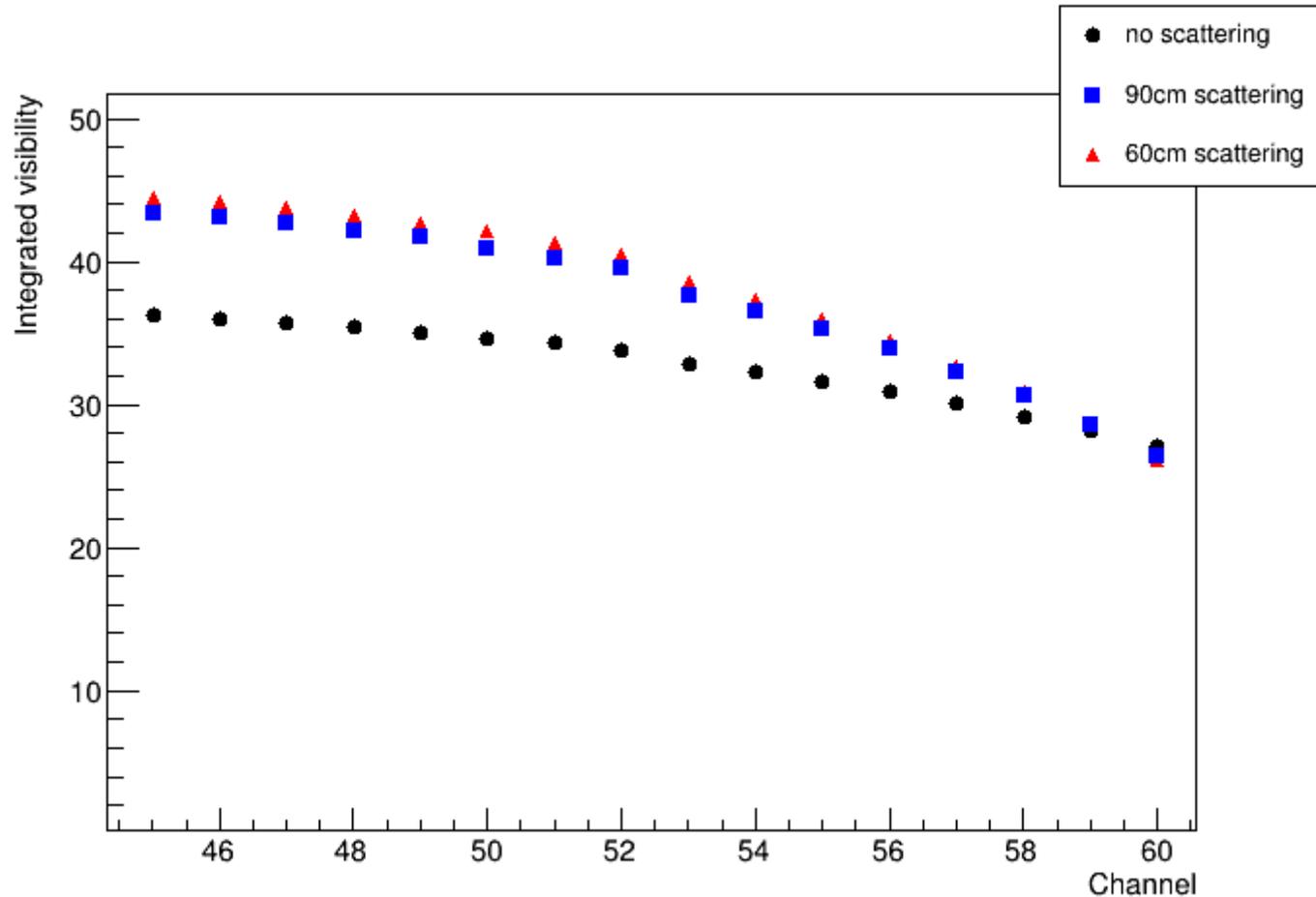
# Libraries visibility studies

- Aim: dependence of light yield vs Rayleigh
  - No scattering, 90cm and 60cm for scattering length
  - Voxels: 2352000 (Nx: 140, Ny: 120, Nz: 140)
  - Only beam side analyzed ( $x < 0$ )

# Integrated visibility per channel

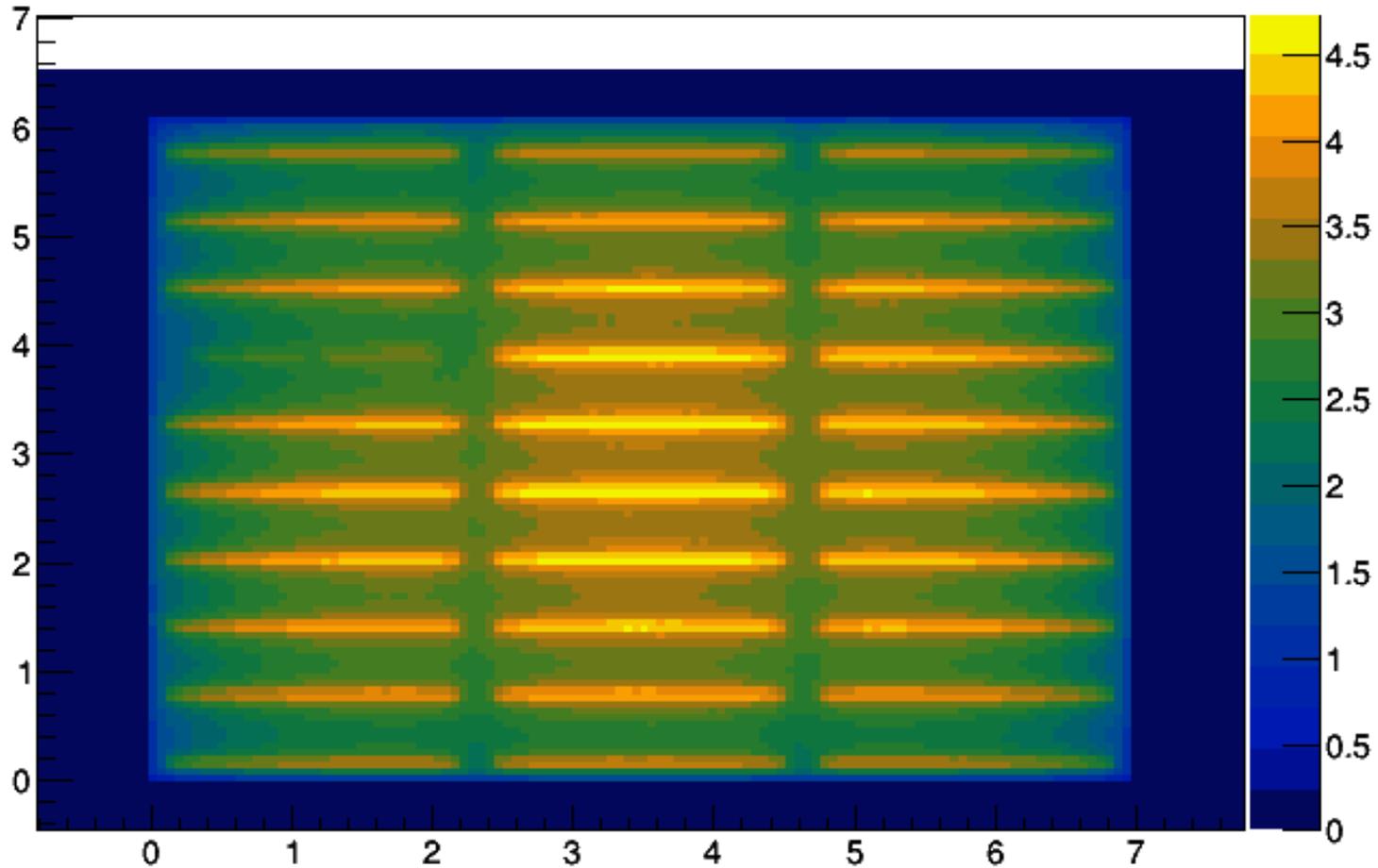


# Integrated visibility per channel

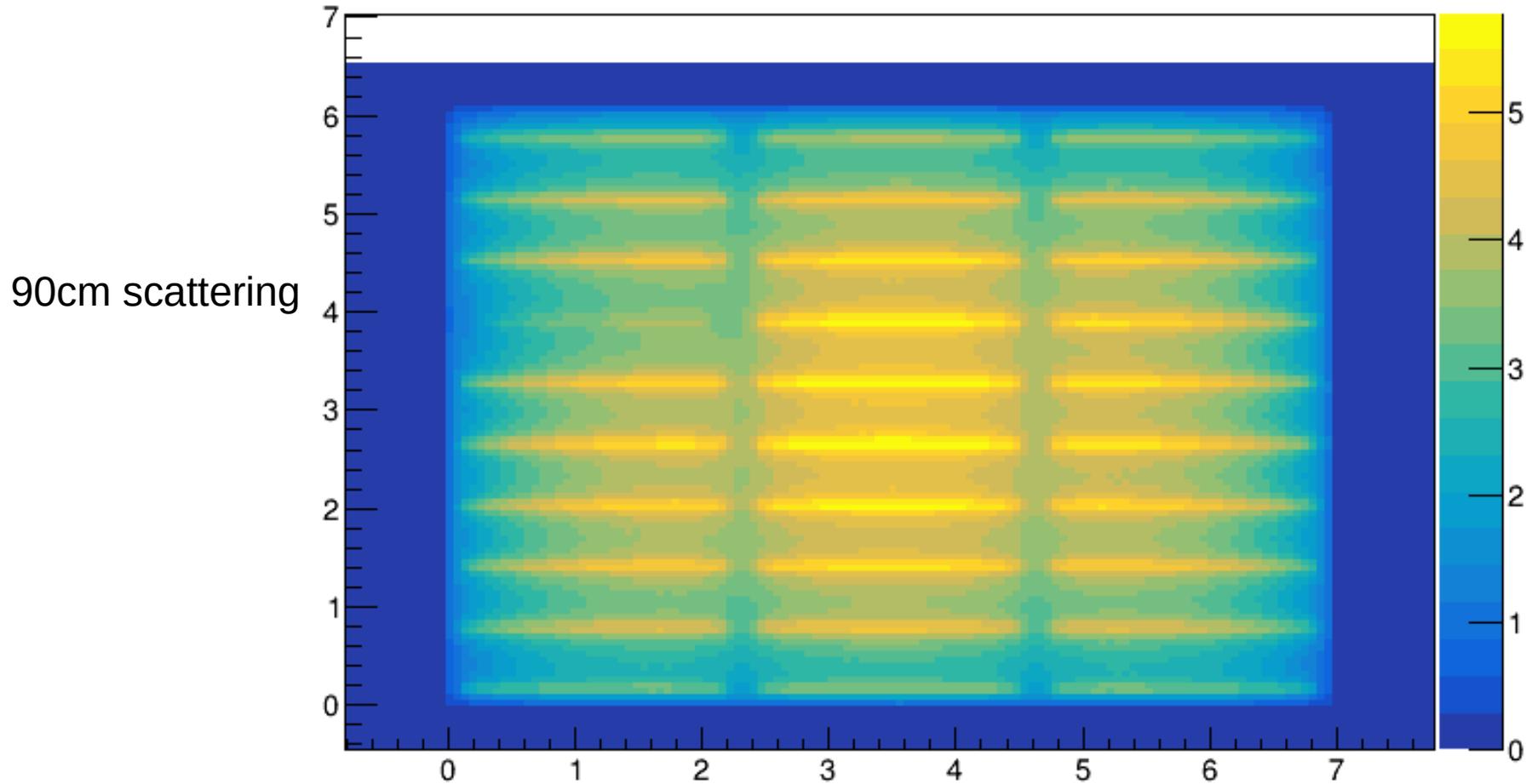


# Integrated visibility map

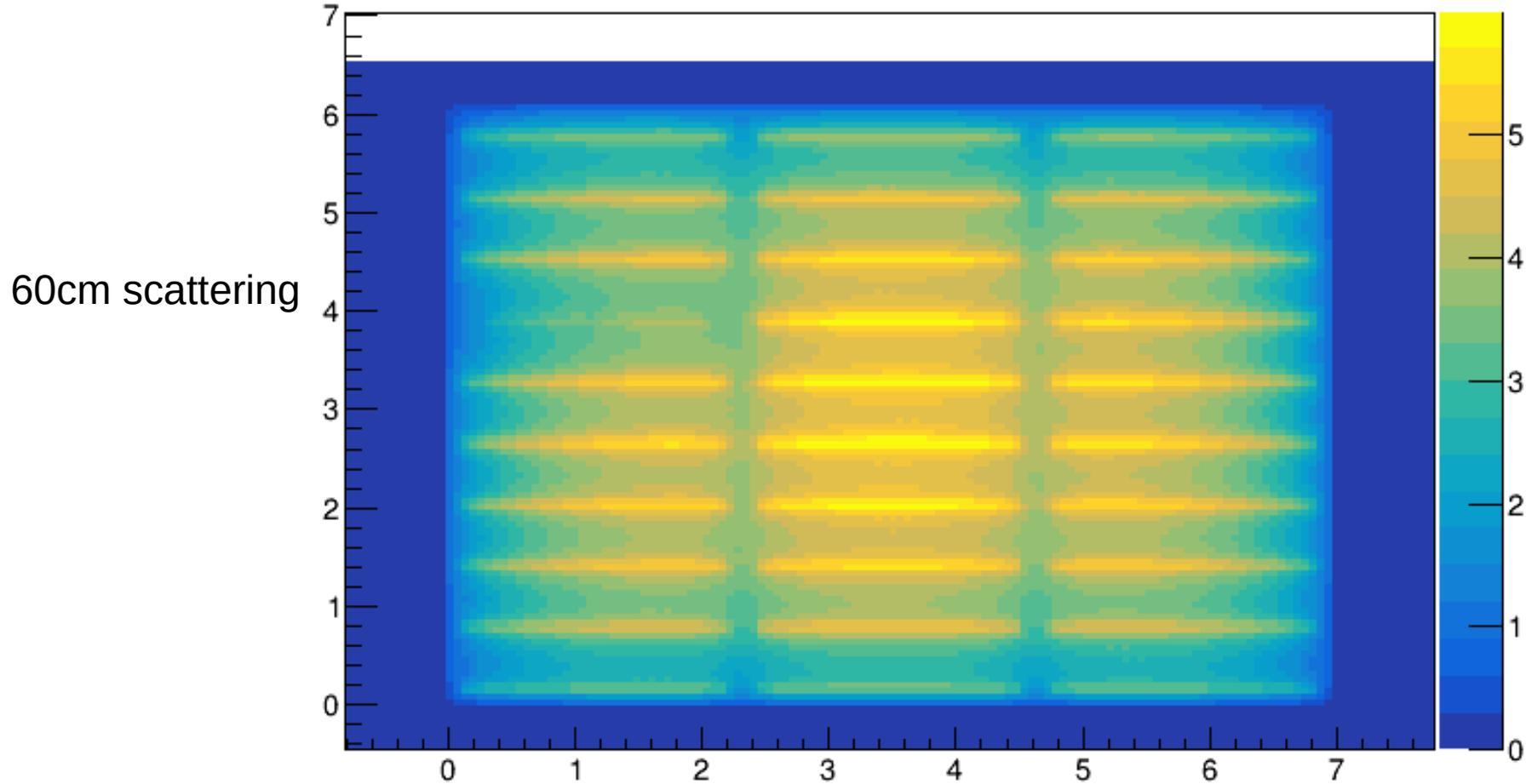
No scattering



# Integrated visibility map

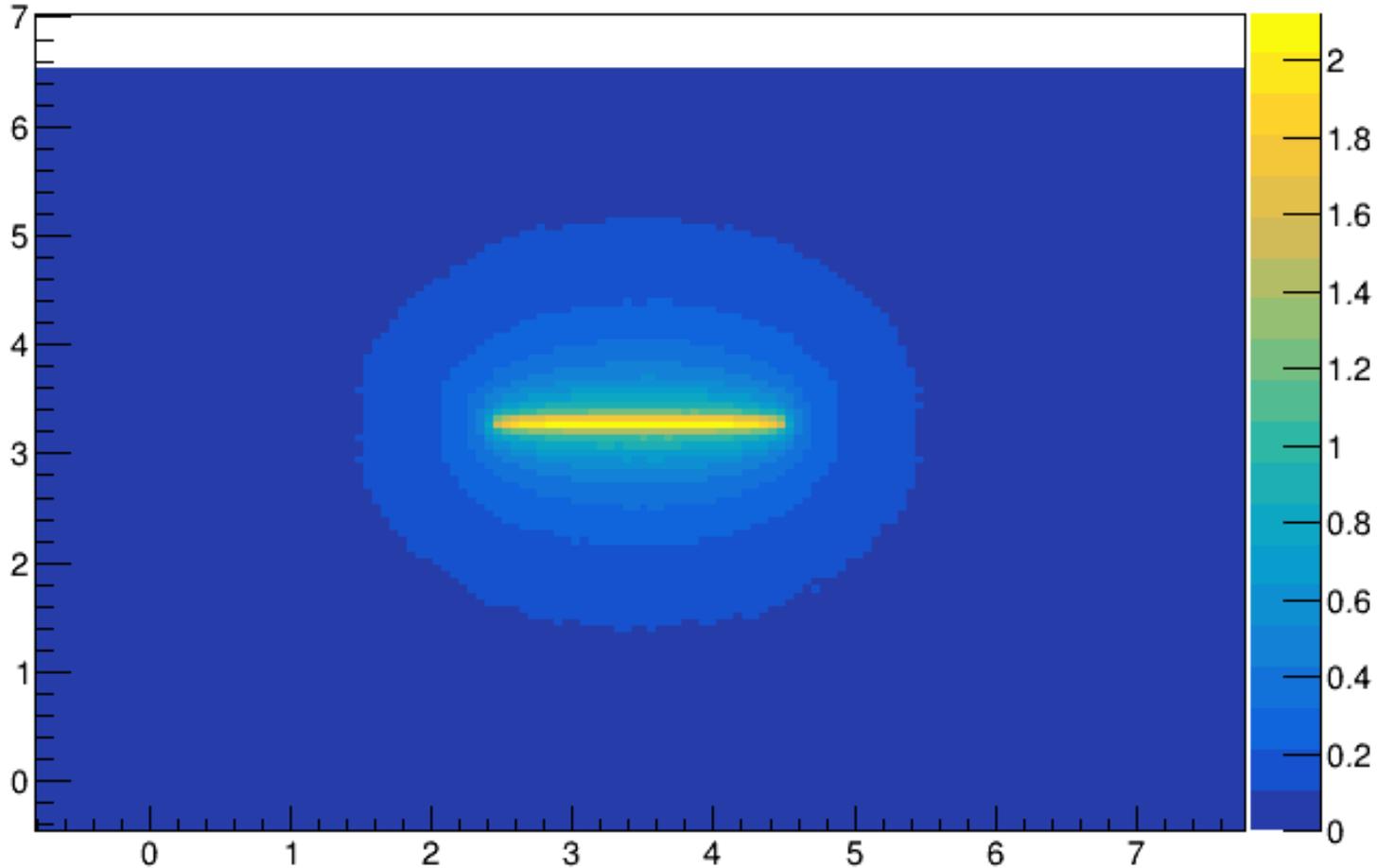


# Integrated visibility map



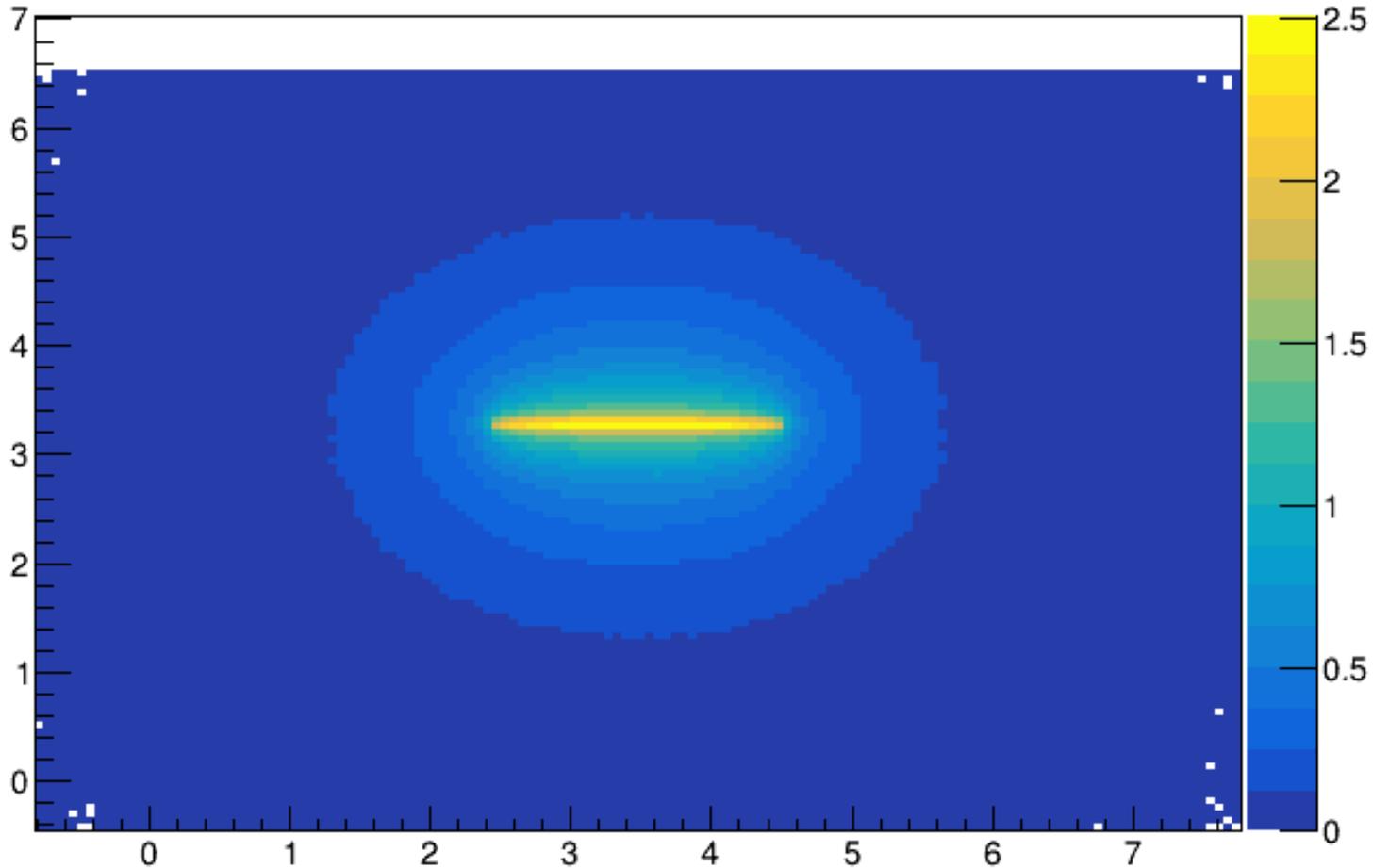
# Single channel visibility map

No scattering  
Channel 75



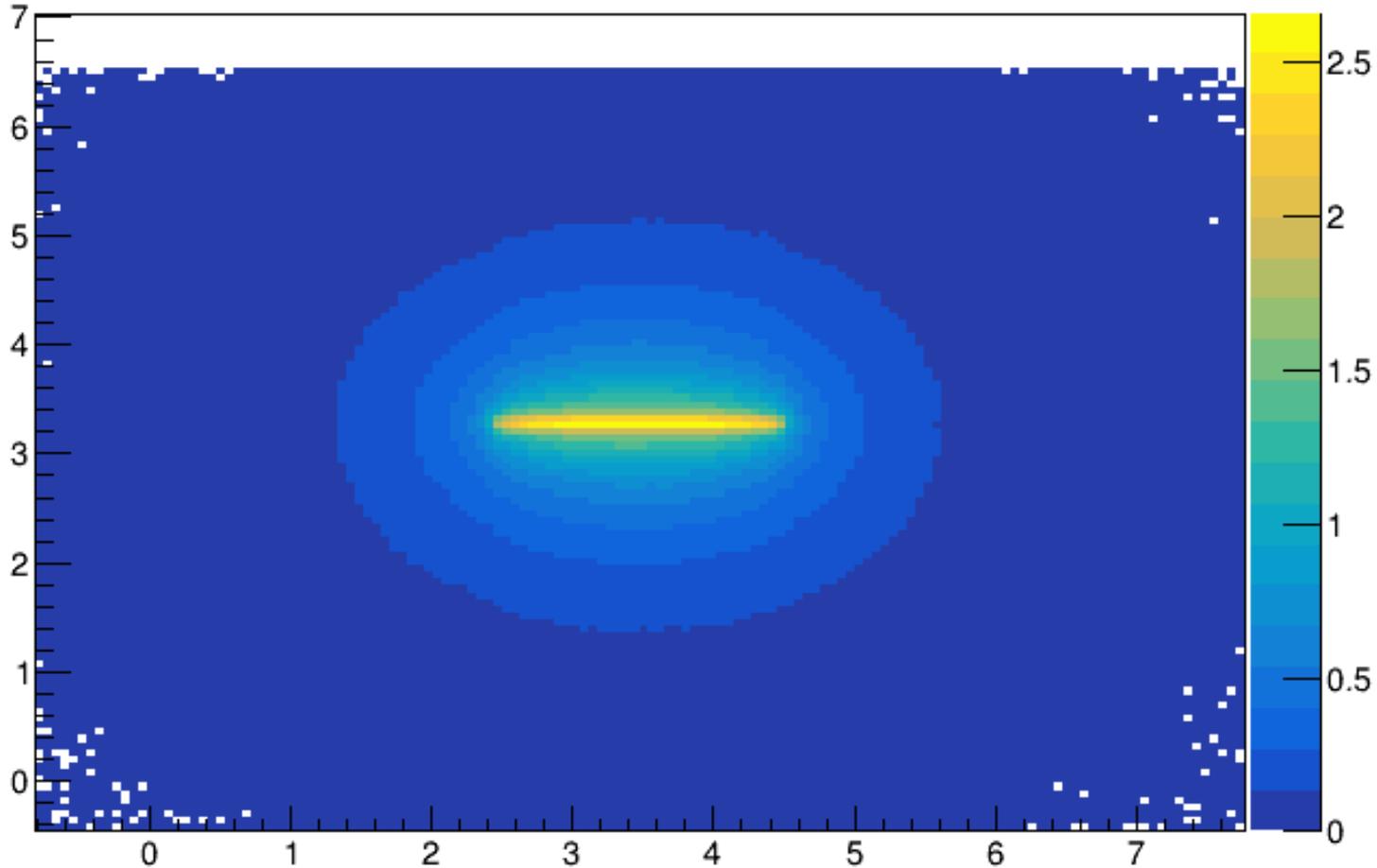
# Single channel visibility map

90cm scattering  
Channel 75



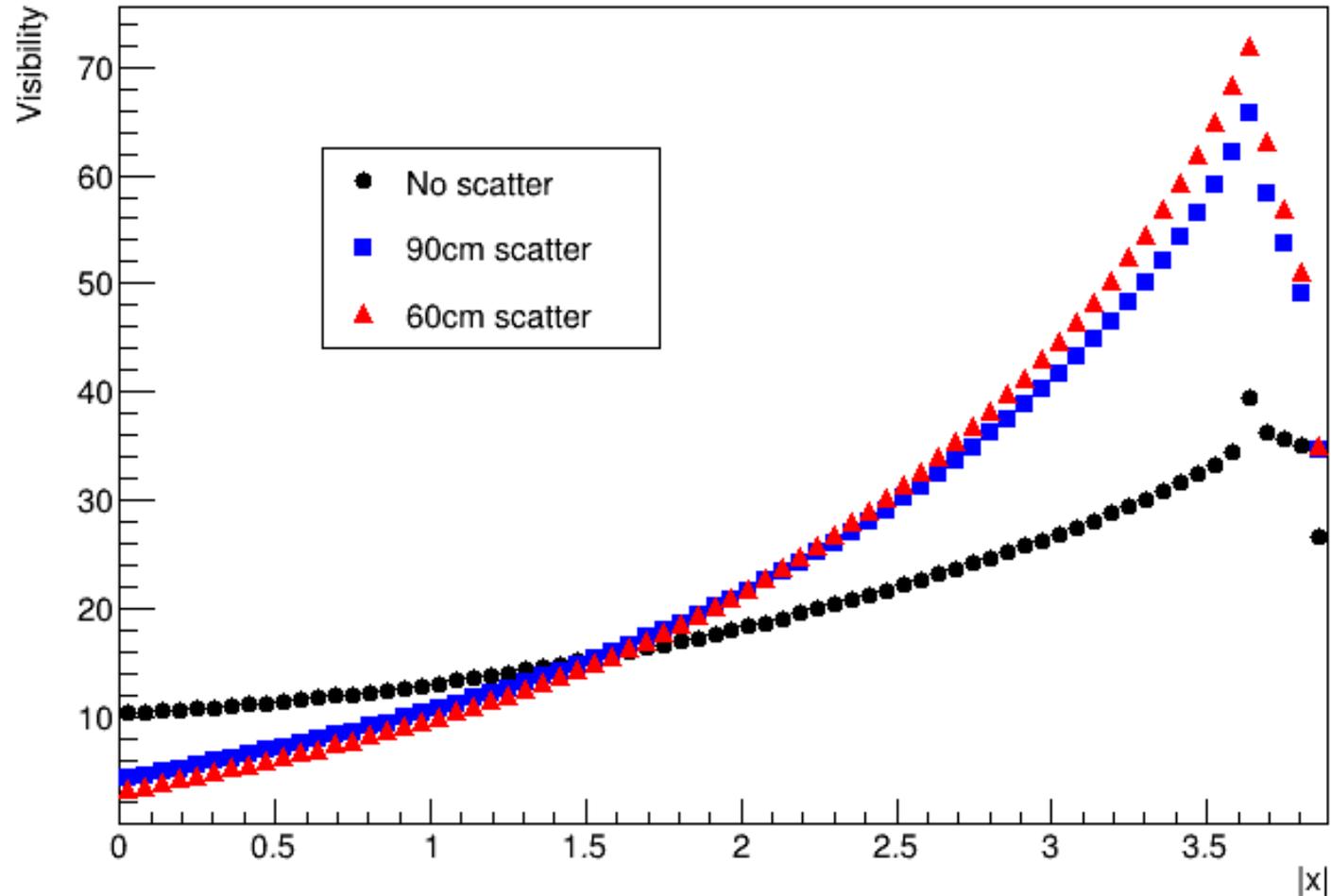
# Single channel visibility map

60cm scattering  
Channel 75

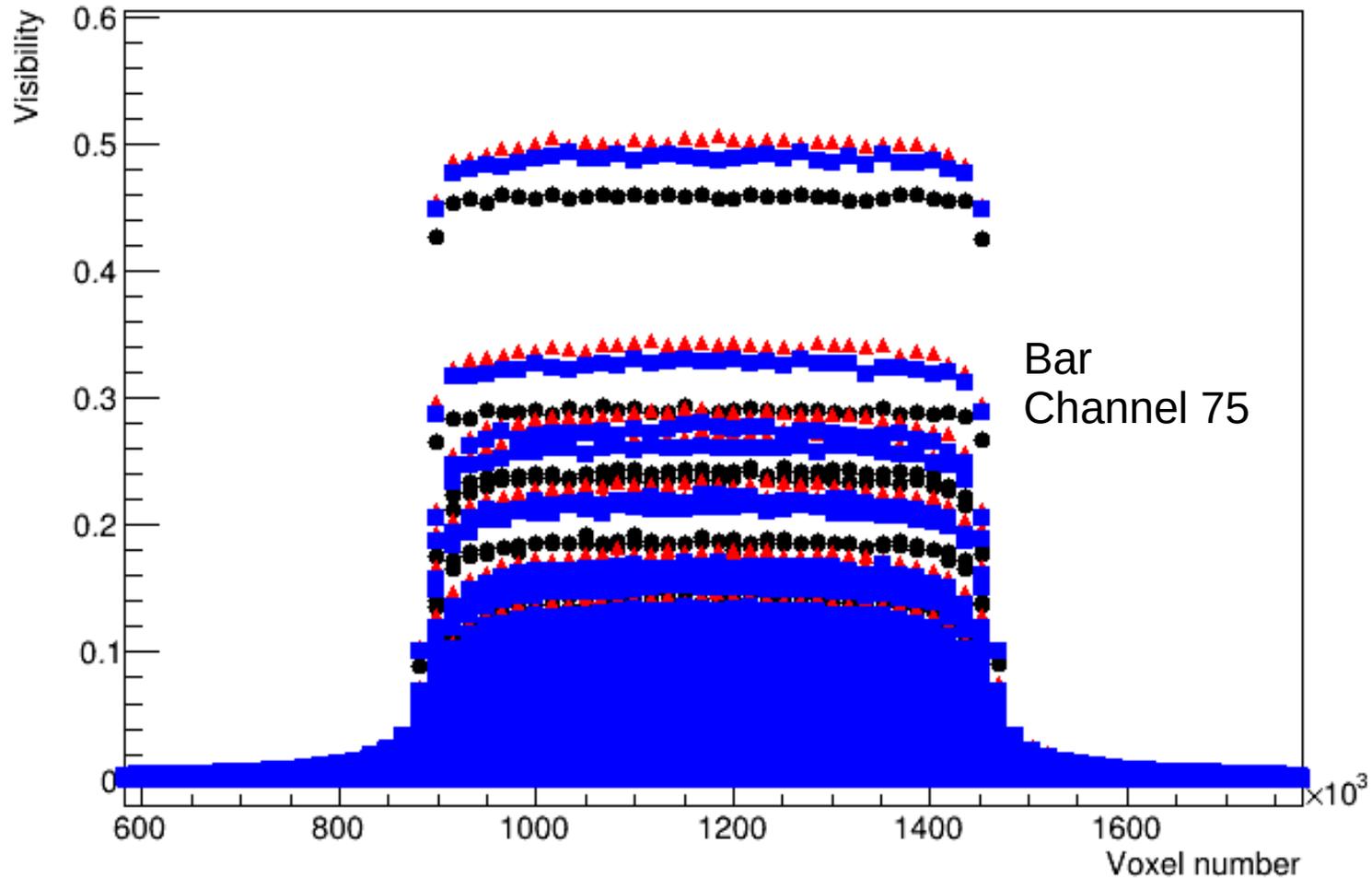


# Single channel visibility slices

Channel 75

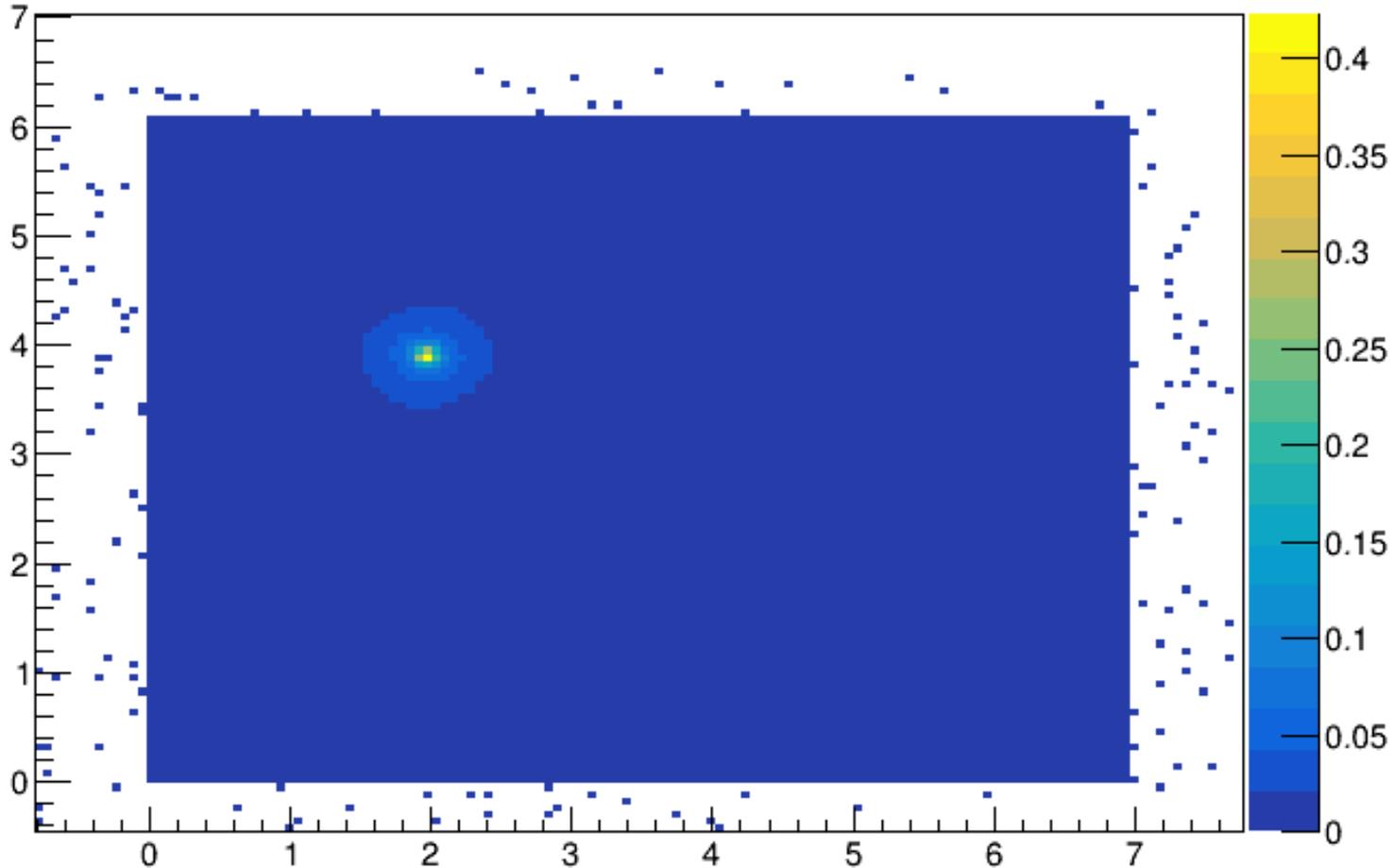


# Visibility per voxel



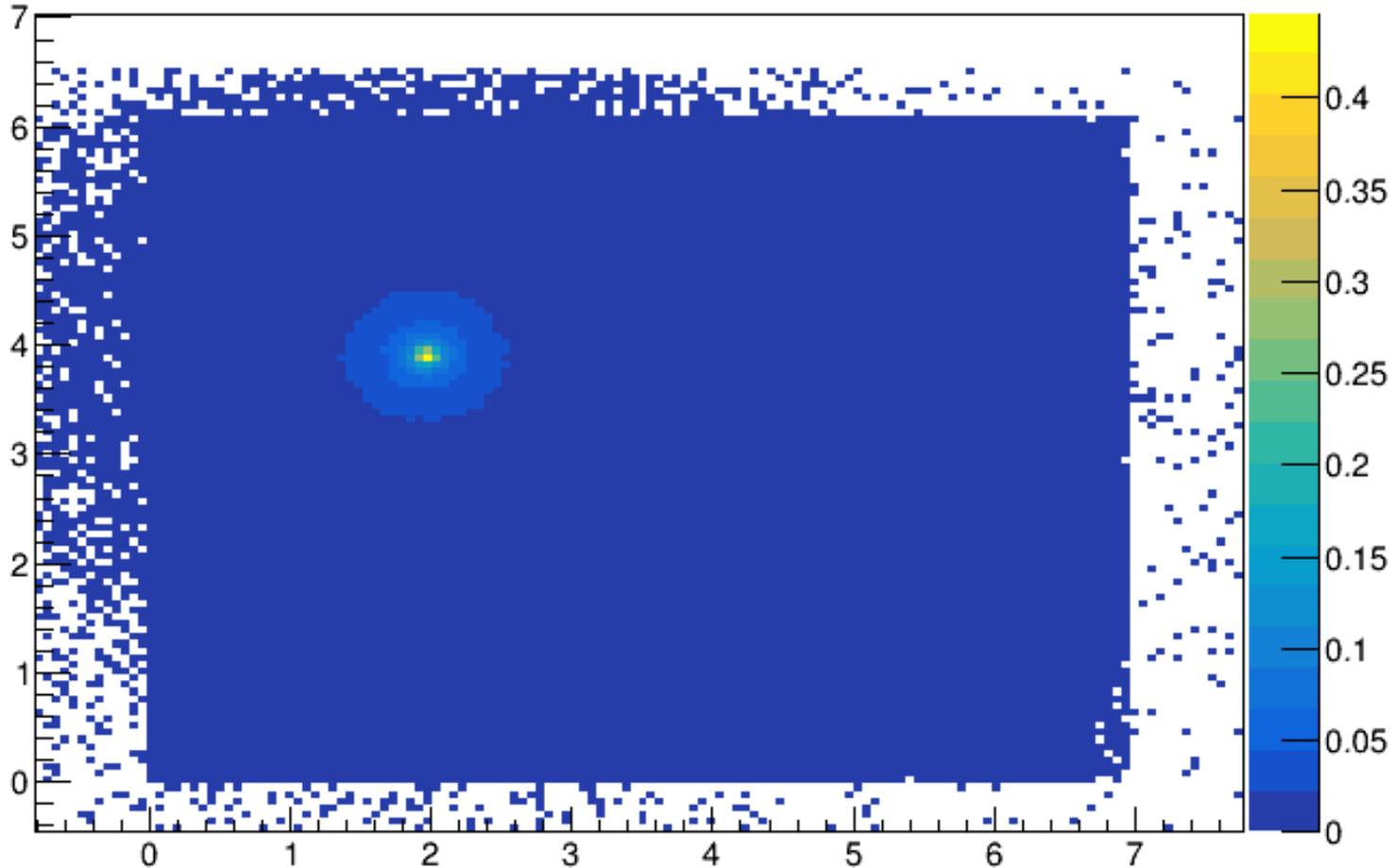
# Single channel visibility map

No scattering  
Channel 45



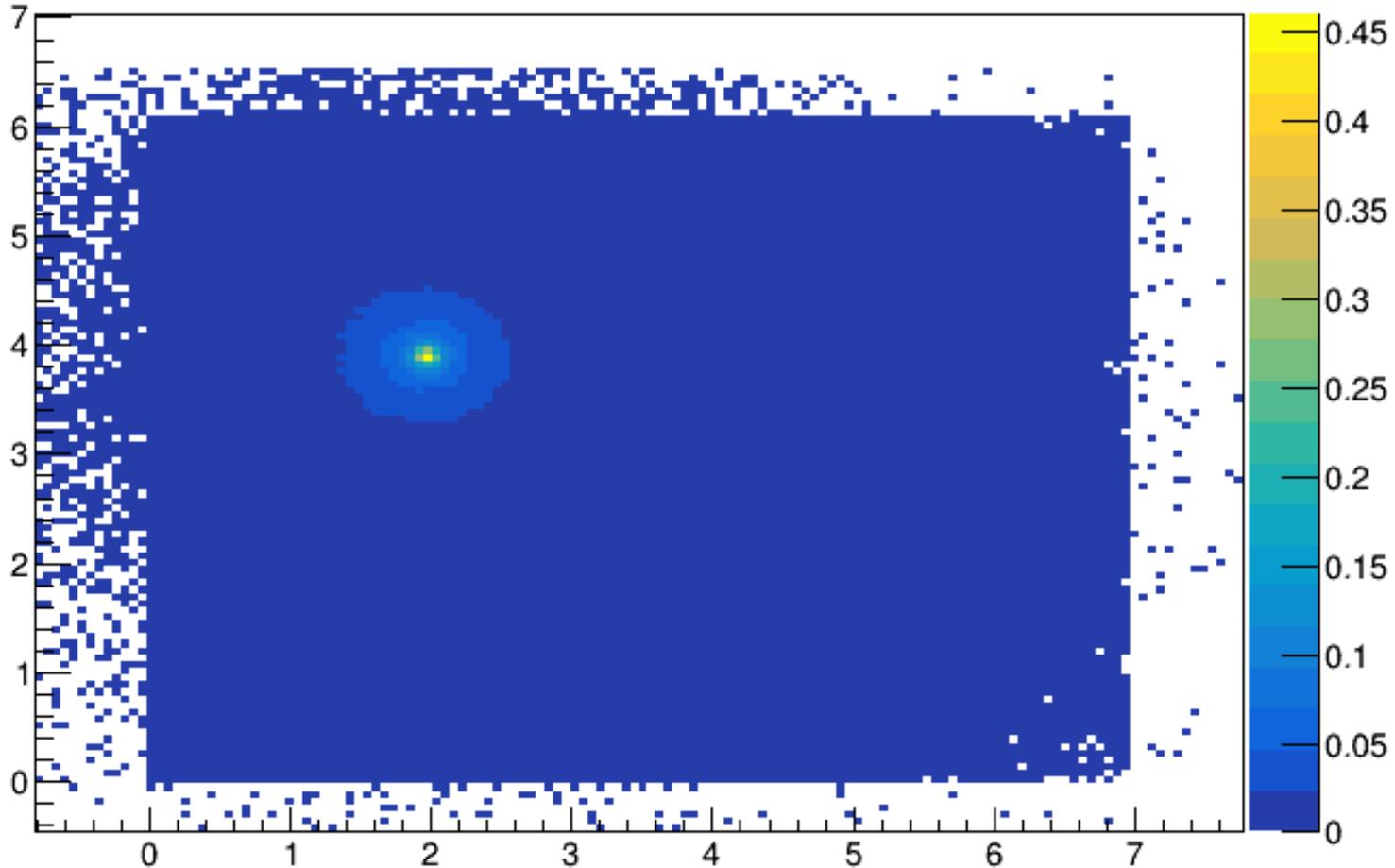
# Single channel visibility map

90cm scattering  
Channel 45

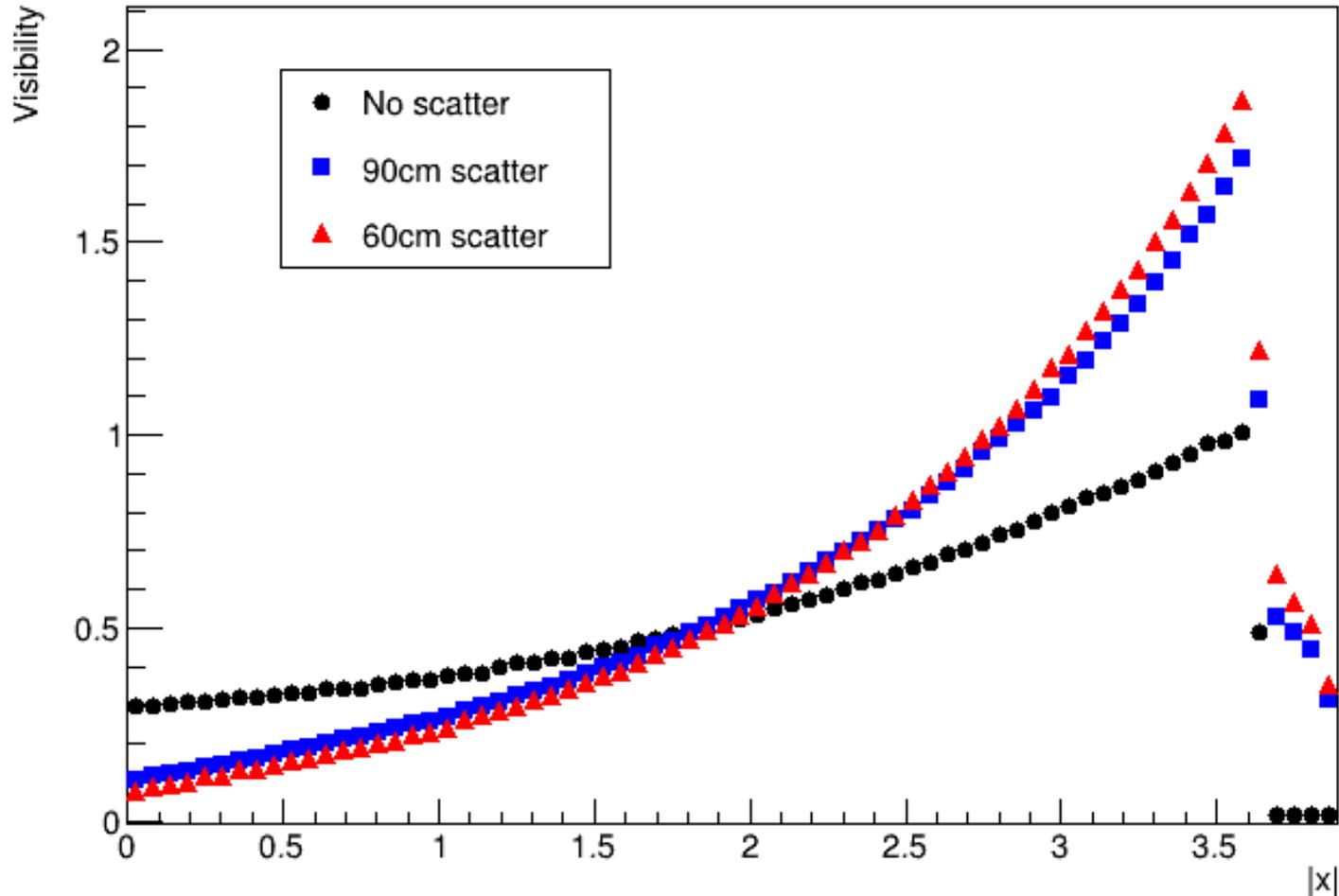


# Single channel visibility map

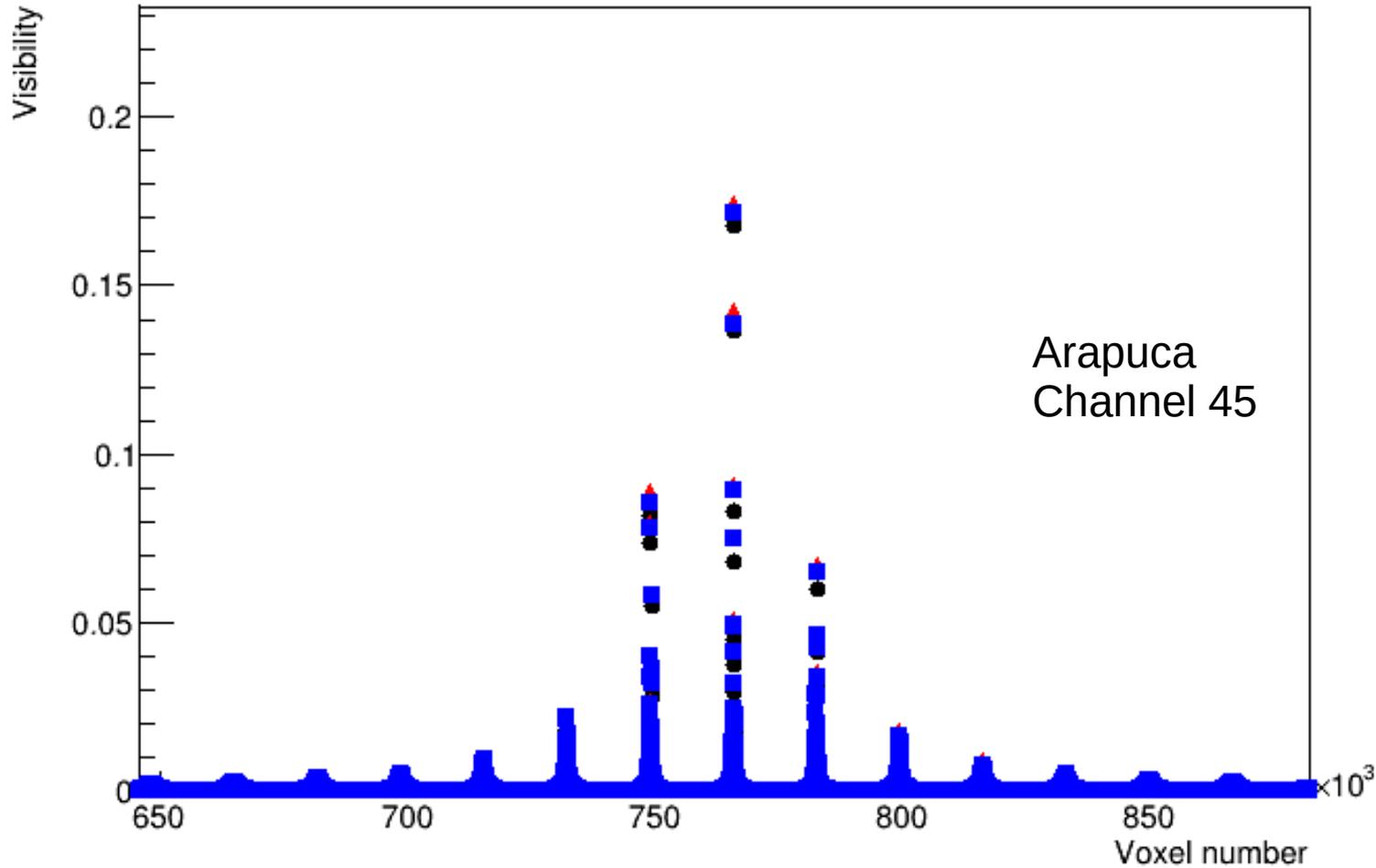
60cm scattering  
Channel 45



# Single channel visibility slices

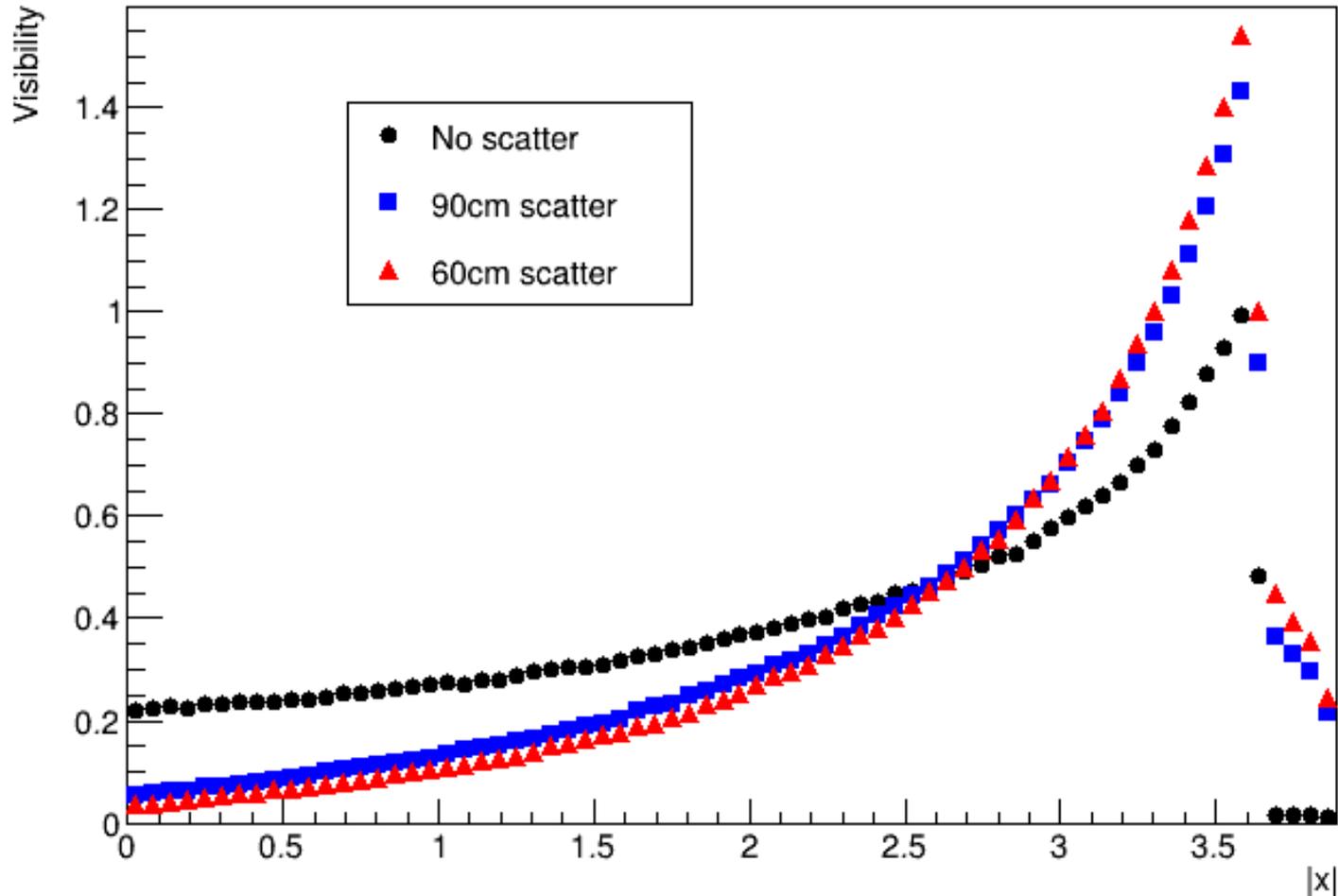


# Visibility per voxels

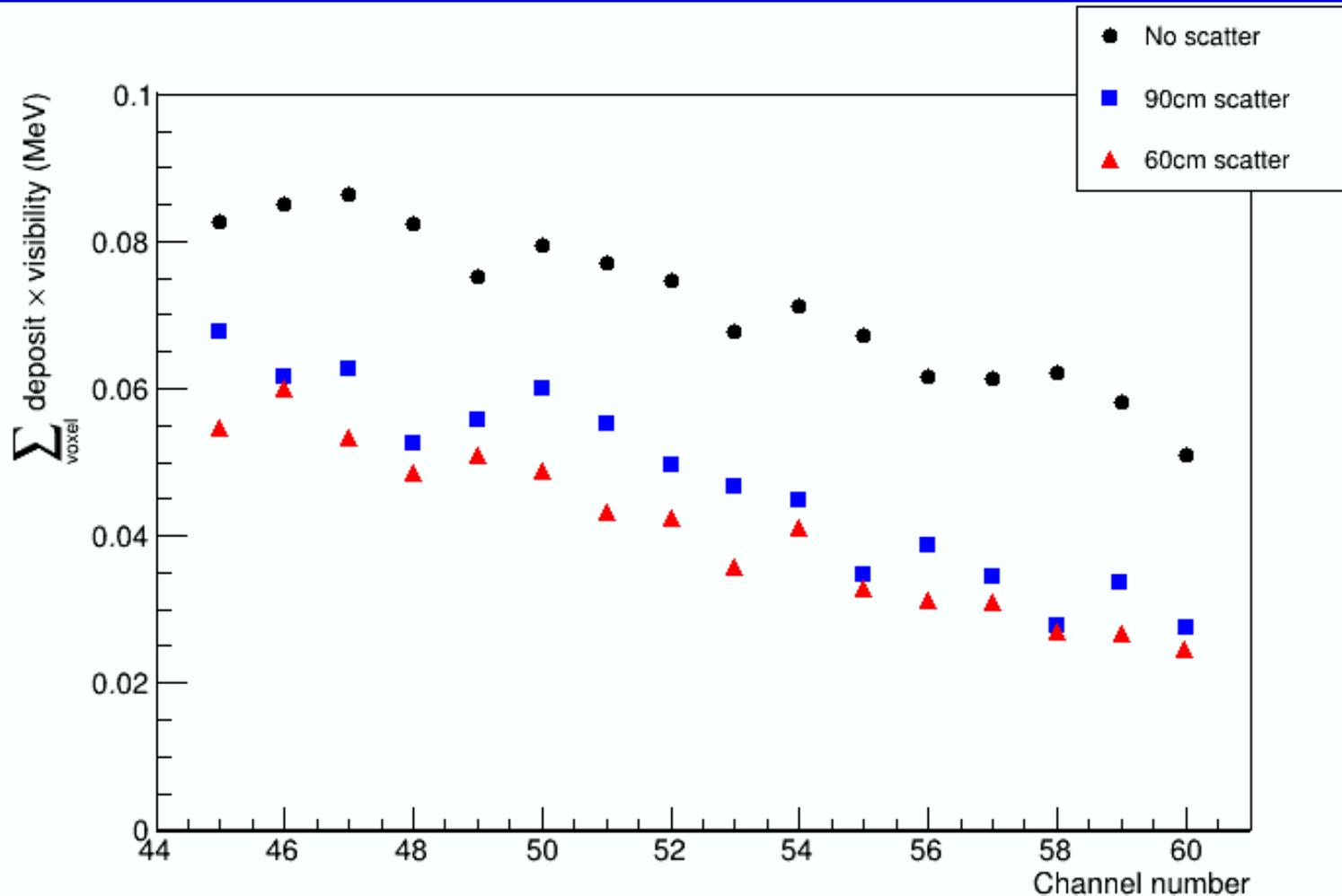


# Single channel visibility slices

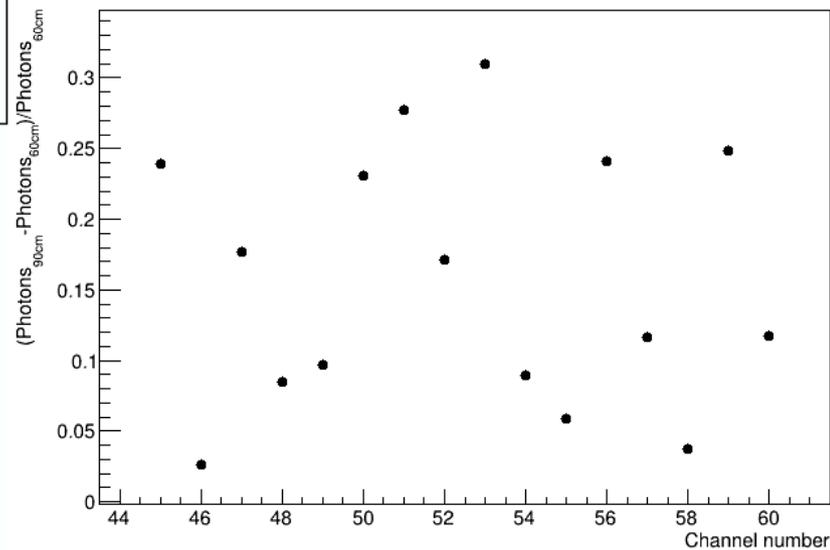
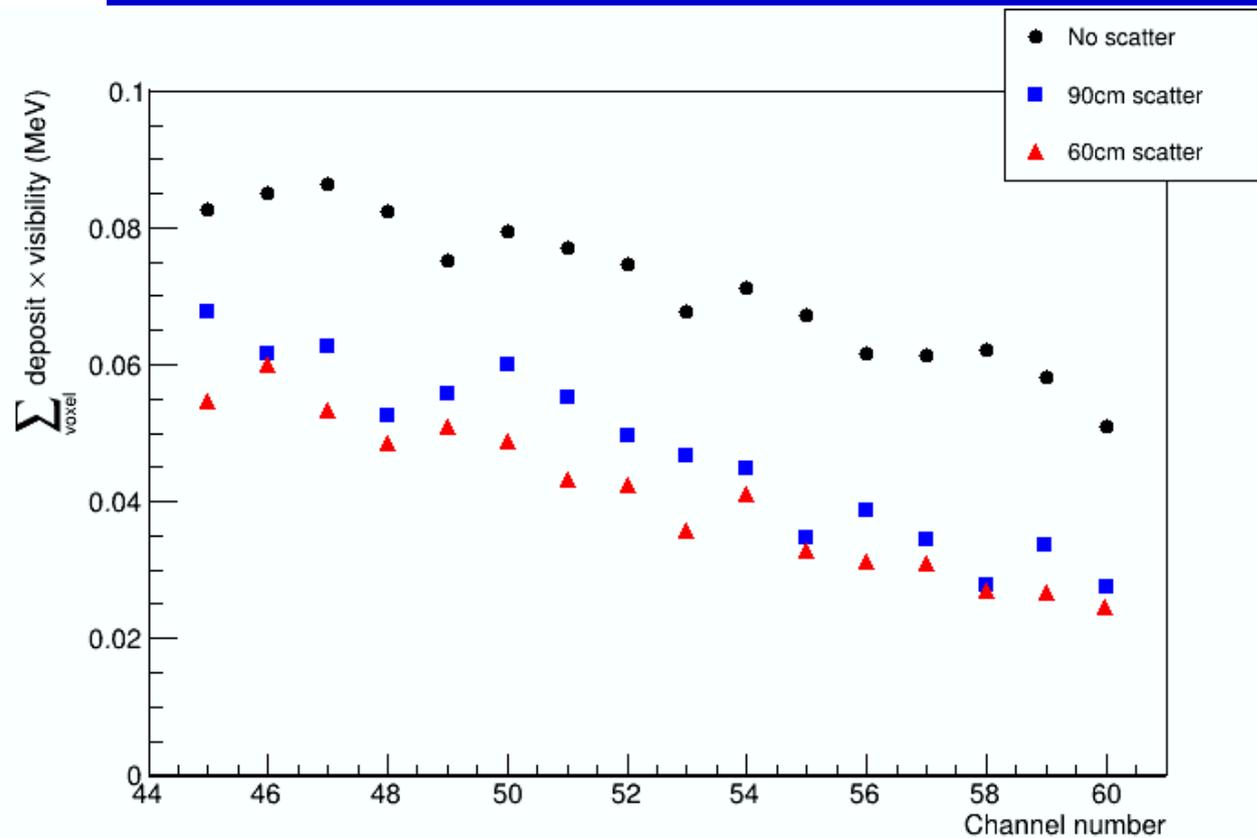
Channel 60



# Muon events: 7 GeV

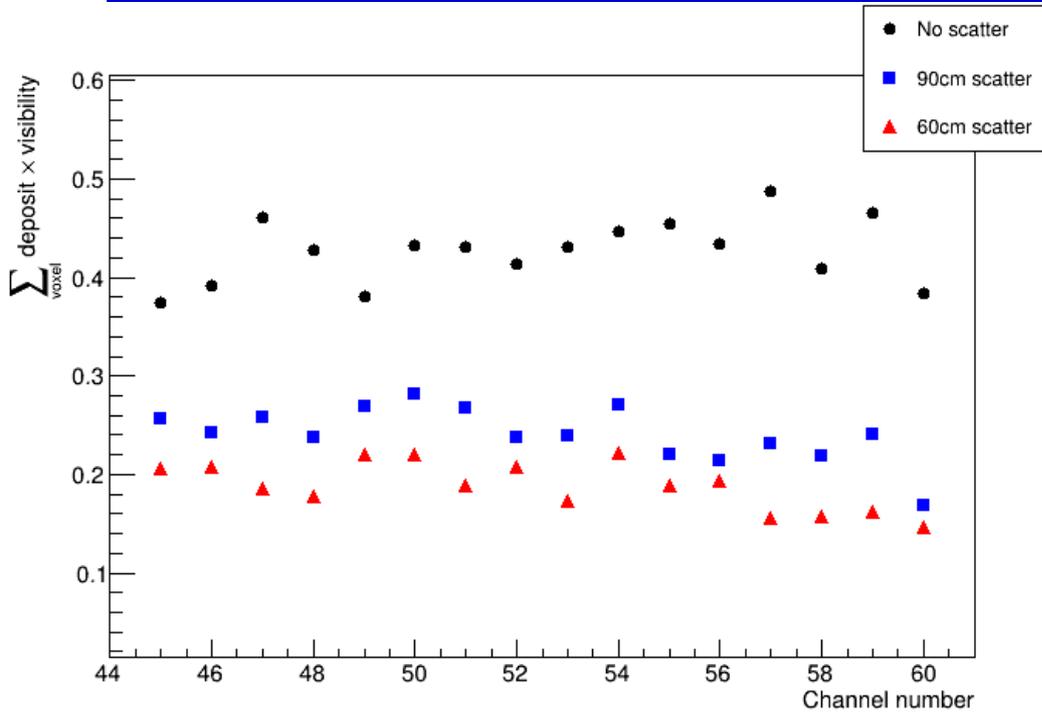


# Muon events: 7 GeV

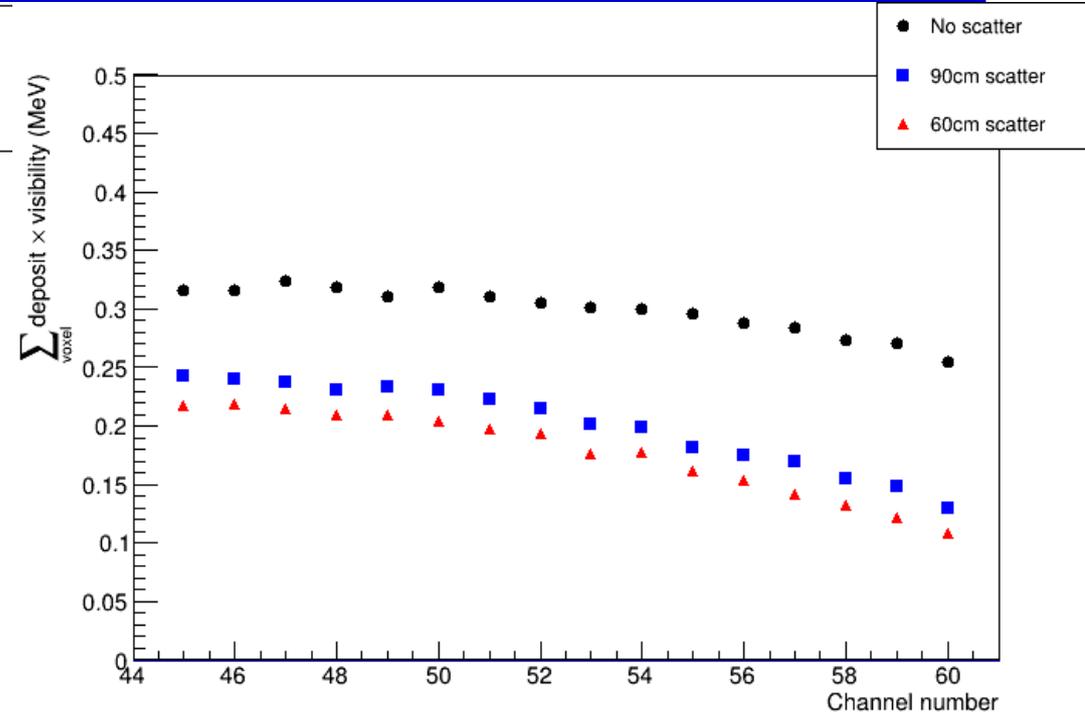


$$\left\langle \frac{\text{Photons}_{90\text{cm}} - \text{Photons}_{60\text{cm}}}{\text{Photons}_{60\text{cm}}} \right\rangle \sim 16 \pm 2\%$$

# Electrons and Pions: 7 GeV

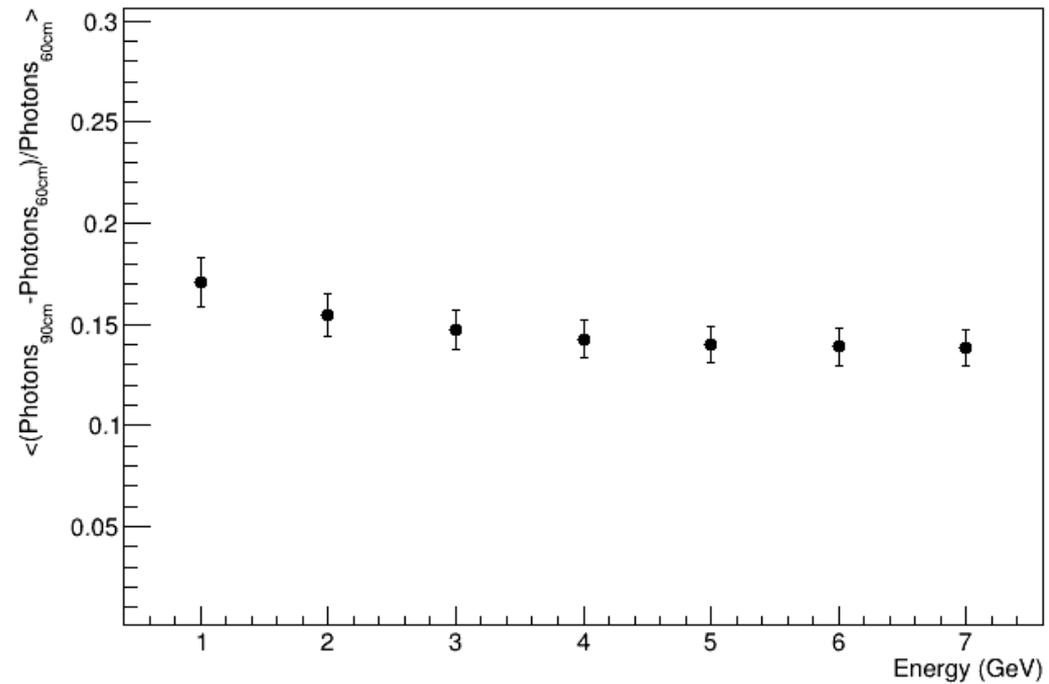
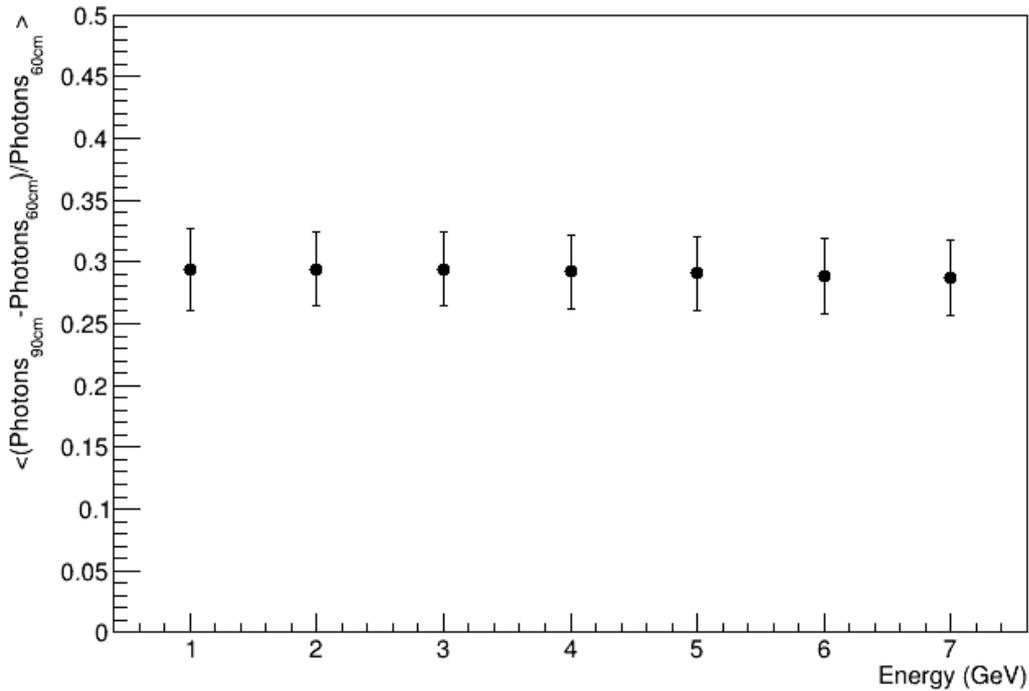


$$\left\langle \frac{\text{Photons}_{90\text{cm}} - \text{Photons}_{60\text{cm}}}{\text{Photons}_{60\text{cm}}} \right\rangle \sim 28 \pm 3\%$$



$$\left\langle \frac{\text{Photons}_{90\text{cm}} - \text{Photons}_{60\text{cm}}}{\text{Photons}_{60\text{cm}}} \right\rangle \sim 14 \pm 1\%$$

# Electrons and Pions



# Conclusions

- Libraries spatial features similar
- Visibilities dependent on scattering length
- Light patterns similar on arapucas
  - Differ only by a scaling factor
- Consistent accross channels
  - type of particles/energy deposits
- Uncertainties on number of photons kept  $\sim 10\%$  ?
  - Considered current experimental knowledge