

GP-SANS Intensity calibration with low-efficiency calibrated monitor

LE Monitor is calibrated at 1.8Å as $\varepsilon(1.8) = 1 \times 10^{-5} \pm ?$ $\varepsilon(\lambda) = \frac{10^{-5}}{1.8} \cdot \lambda(\text{Å})$

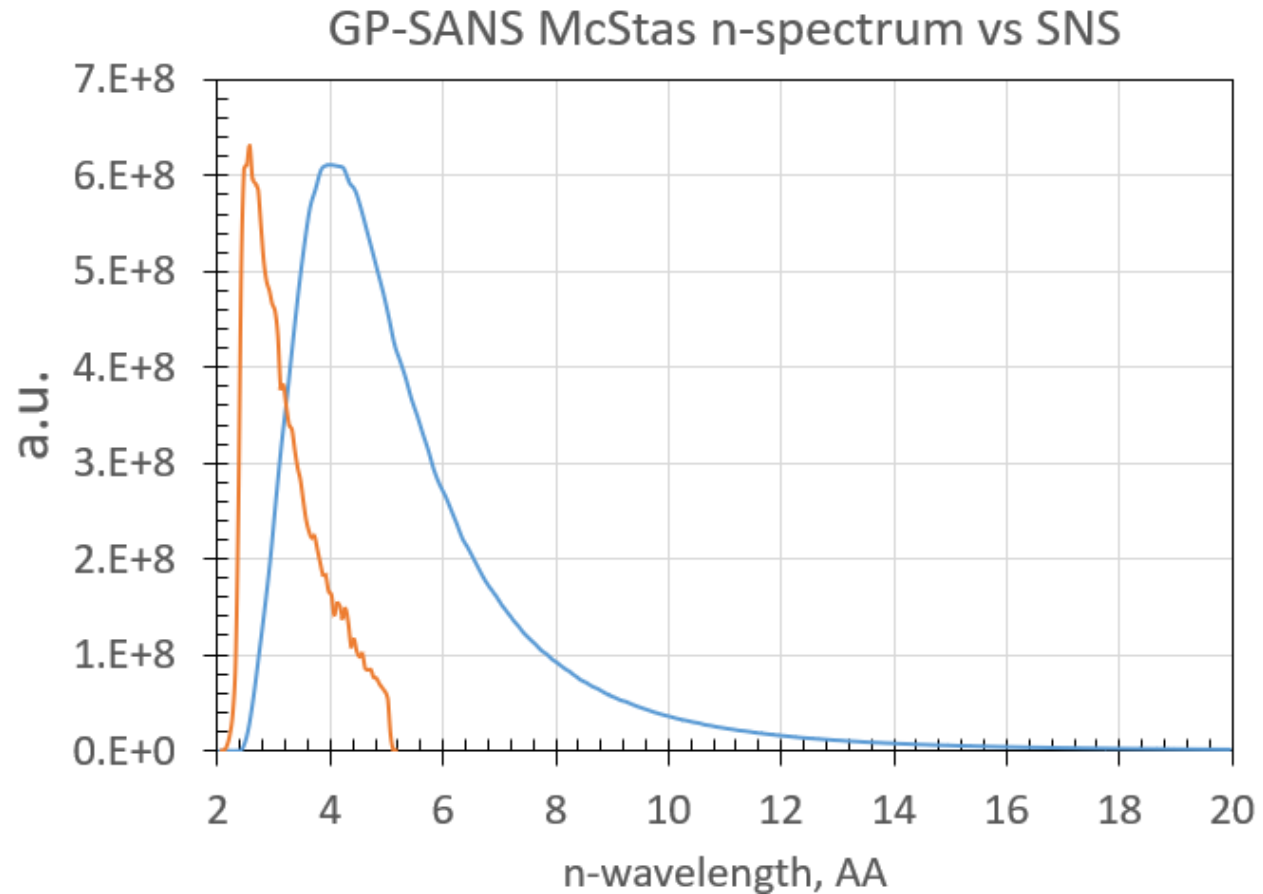
$S(\lambda) = \frac{dI}{d\lambda}$ spectrum of GP-SANS beam with integral intensity $I_0 (s)^{-1} = \int_2^{20} S(\lambda) \cdot d\lambda$

Detected by LE Mon integral intensity $N(s)^{-1} = \int_2^{20} S(\lambda) \cdot \varepsilon(\lambda) \cdot d\lambda$

$$\frac{N}{I_0} = \frac{10^{-5}}{1.8} \frac{\int_2^{20} S(\lambda) \cdot \lambda \cdot d\lambda}{\int_2^{20} S(\lambda) \cdot d\lambda} = \frac{10^{-5}}{1.8} \cdot \bar{\lambda}$$

$$I_0 = N \cdot 10^5 \cdot \frac{1.8}{\bar{\lambda}}$$

GP-SANS Spectrum after 8-guides simulated by McStas (Lisa)



GP-SANS Average velocity: $(840 \pm \text{RMS } 229) \text{ m/s}$

GP-SANS Average Lambda: $(5.53 \pm \text{RMS } 2.13) \text{ AA}$

Run 89824 LE Mon upstream of Mag-H (Cd in the beam)

LE Mon = 4,230,278 / 219.26 s = 19,293.43 s⁻¹ (=N without efficiency correction)

$$I_0 = N \cdot 10^5 \cdot \frac{1.8}{\lambda} = 6.28 \times 10^8 \text{ n/s (efficiency corrected)}$$

Run 89950 LE Mon is downstream of Mag-H (B4C bore hole open, no Cd)

LE Mon = 6,317,405 / 318.649 s = 19,825.6 s⁻¹ (=N without efficiency correction)

$$I_0 = N \cdot 10^5 \cdot \frac{1.8}{\lambda} = 6.45 \times 10^8 \text{ n/s (efficiency corrected)}$$

