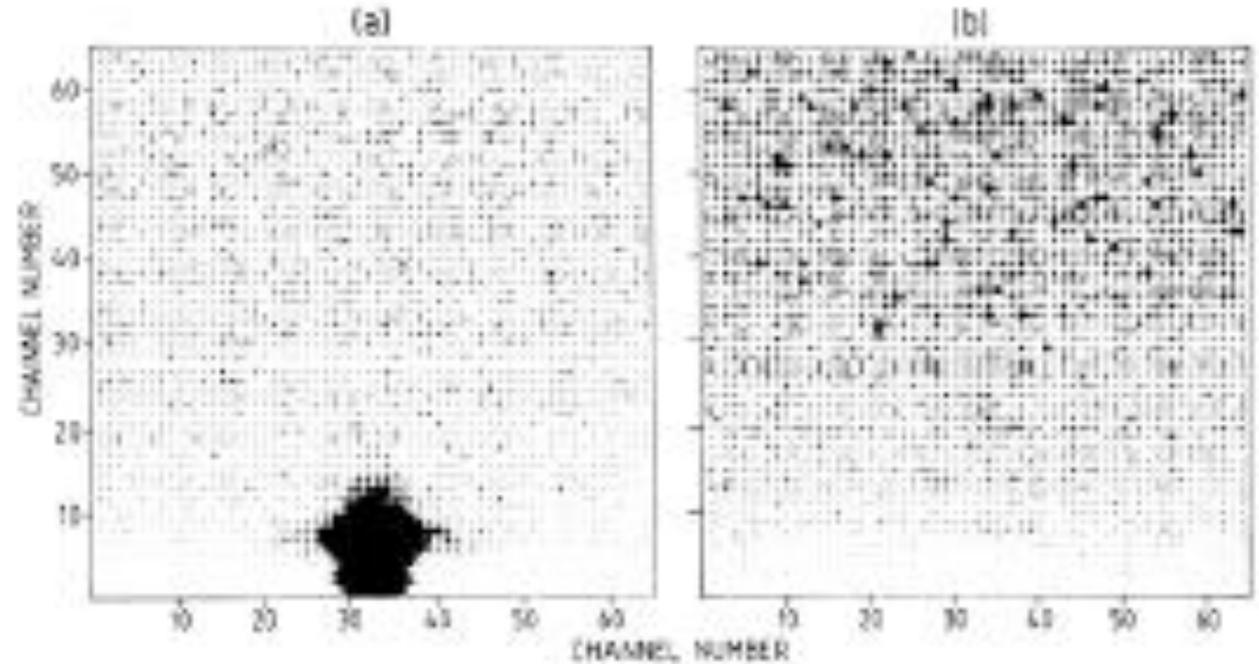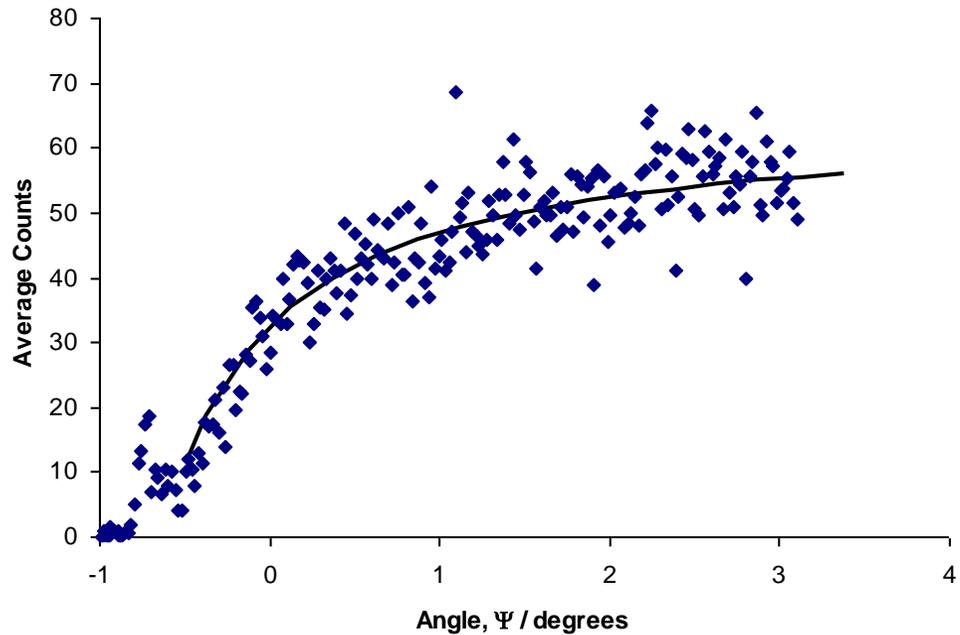# Background – some ideas

What is 'background'?

- Parts of the detected signal that one does (currently) not want to analyse

- Components are:

  Instrument dependent

  Sample environment dependent

  Sample dependent

- Challenges: Often largest component of signal and multiple scattering

Solvent background

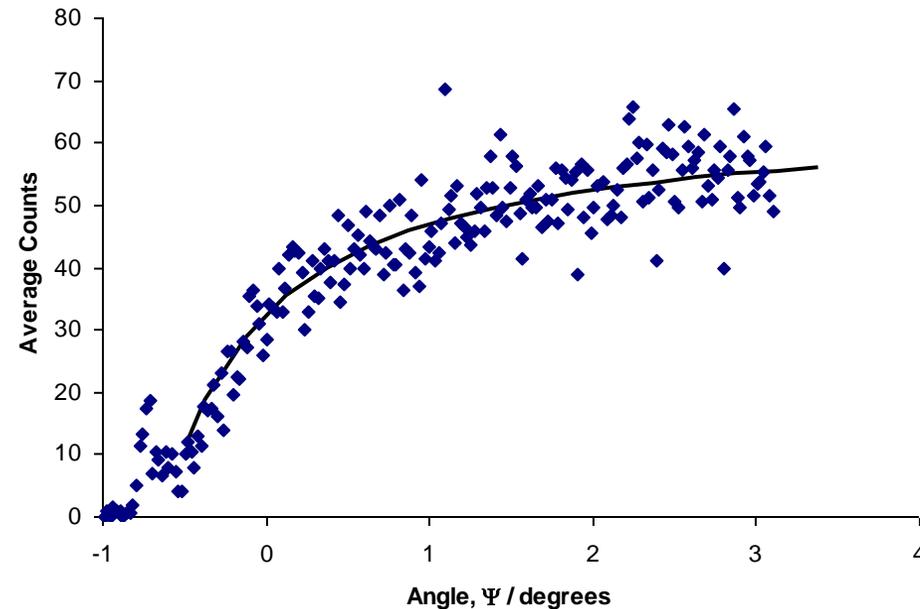Scattering from D_2O and from null reflecting water (8% D_2O) (Water/Air interface)

D17 – ILL, Grenoble

Rennie et al., *Macromolecules* **22**, 3466-3475 (1989).

Multiple Incoherent Scattering

$$P(\theta) = 1/[\ 4\pi\ \mu^2\ \{(1/\sin\theta_i) - (1/\sin\theta_o)\}]$$

Background for reflection is not flat

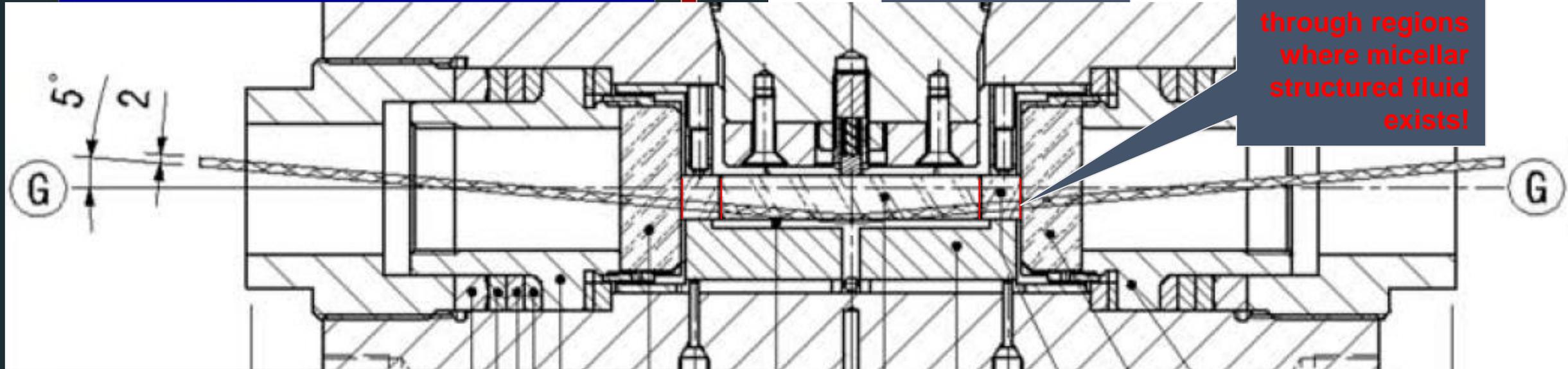Multiple scattering and geometry give non-uniform intensity

8% D_2O in H_2O - null reflecting water

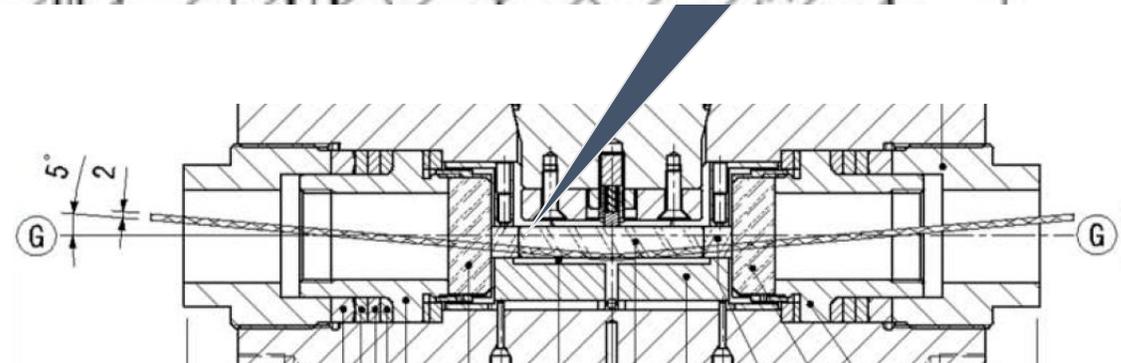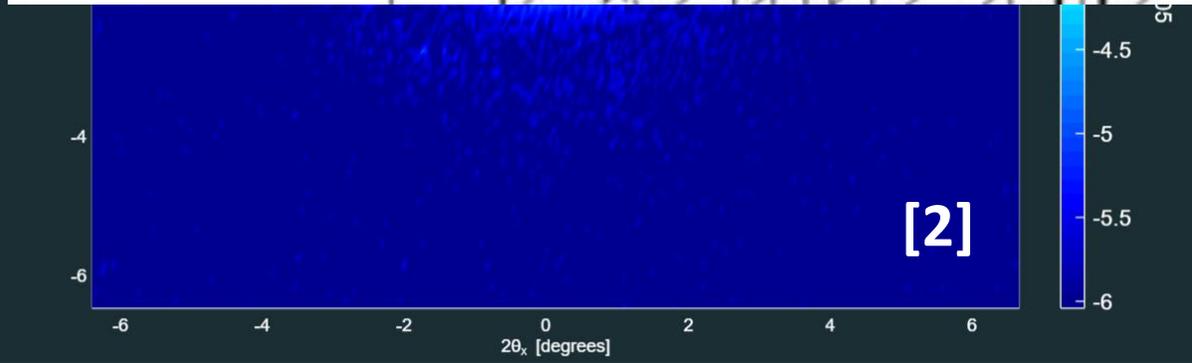Figaro, ILL, Grenoble, 0.6° incidence

Sample Environment

- Scattering may include some sample:

    - Material not at interface
    - Inelastic scattering

- Sample attenuates beam

- Sample modifies reflectivity

- Simple subtraction is likely not to work
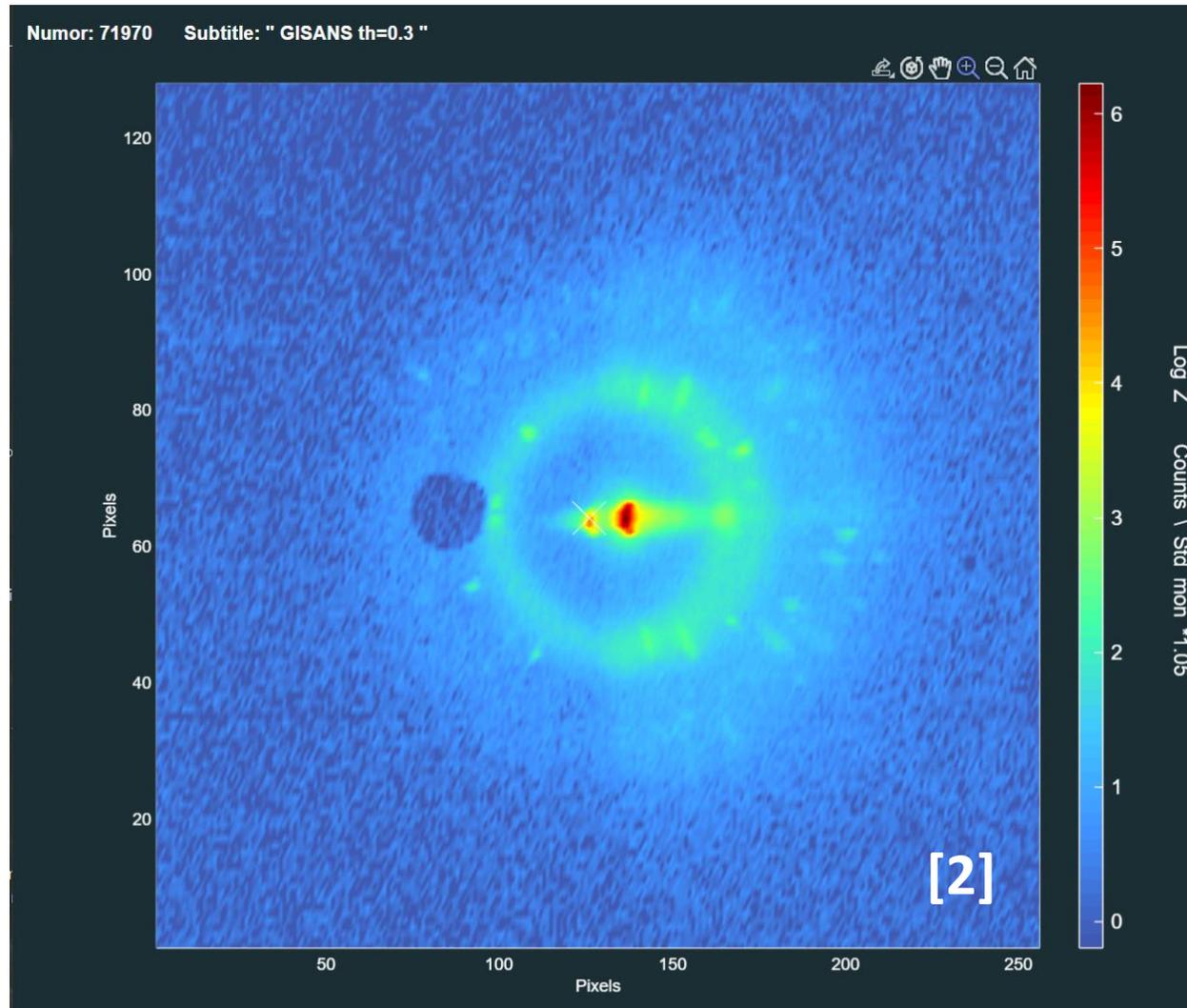
DB contains "SANS-like"

DB crosses through regions where micellar structured fluid exists!

[2]

-4.5
-5
-5.5
-6
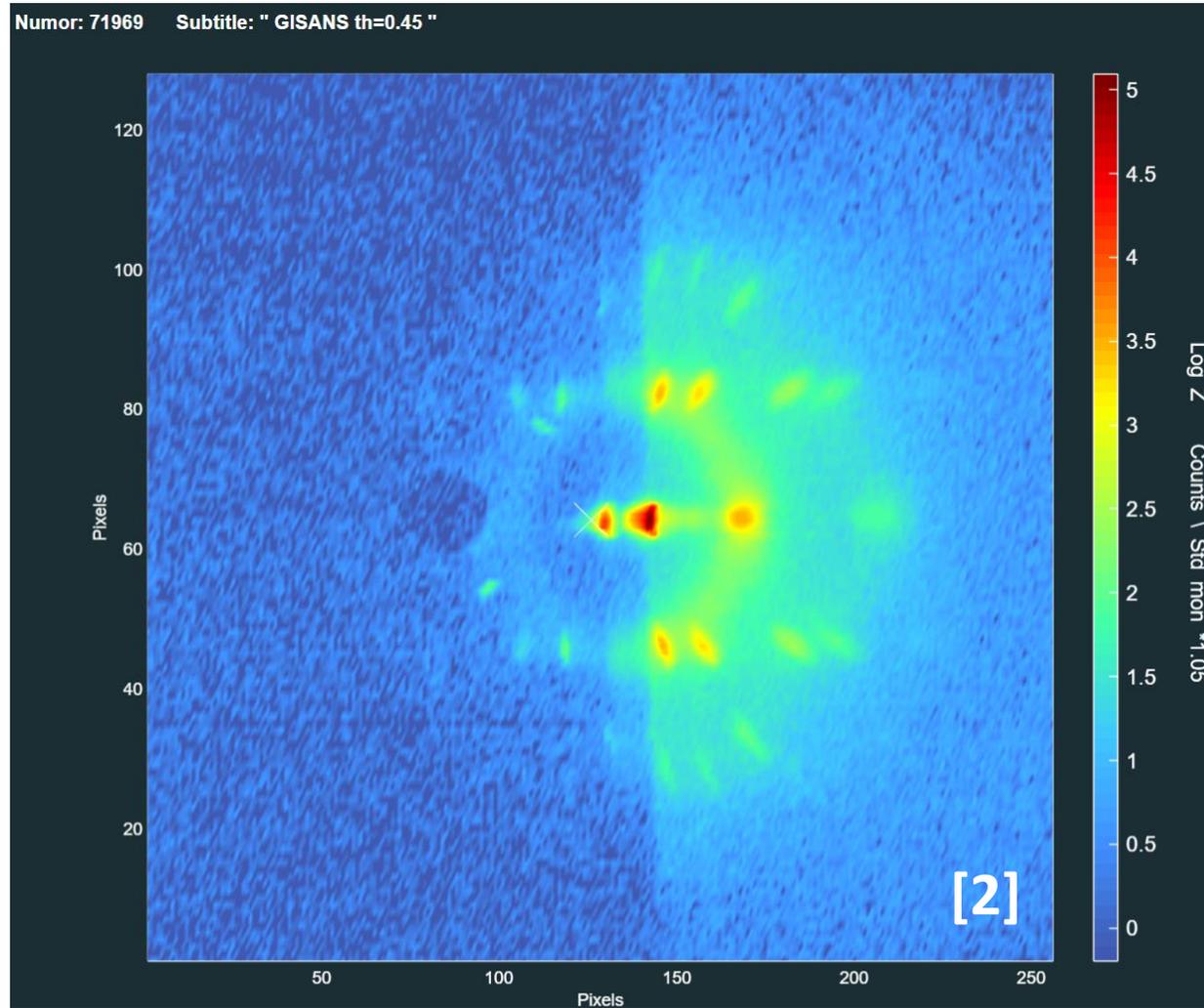
$2\theta_x$ [degrees]

(Direct Beam, T=35 °C, P=1 bar)

16/03/2026

(GISANS, $\alpha_i=0.3°$, T=35 °C, P=1 bar)

Data from Wolff,
Vagias *et al.*

(GISANS, α_i=0.45°, T=35 °C, P=1 bar)

Data from Wolff,
Vagias *et al.*

Some Discussion Themes

- What information is needed with data to fit models of background?

- Are there general recommendations to handle background scattering?

- Is least squares fitting of models for background feasible?

- Are empirical models useful? Are empirical models adequate?

- What models are needed?