Paul said: “you should discuss”:

Nomadic utopia:

towards a better understanding of all instrumental artifacts

Charles replied: “what does this mean? - other than correctly understanding your instrument resolution and bits of your instrument that don't work properly?”

..... implicit was the assumption that we know how to perform our experiments properly

- Detectors

  - Uniformity (sensitivity)
  - Uniformity (spatial)
  - Uniformity (in time, i.e. drift)
  - Geometrical effects, e.g. parallax
  - Dead-time and non-linearity in counts

- Instrument

  - Clean collimation
    - Reflections from collimation are hard to deal with
    - Aperture scattering / diffraction

  - Bad setup
    - Air paths
    - Angular access
    - Reflections due to sample env., instrument windows etc.

  - Windows
    - Silicon – phonon scattering
    - Quartz – incoherent scattering

  - Monochromators
    - Selector – correlation of θ and λ
    - Crystal mono – correlation of θ and λ

  - Attenuators
    - Accurate callibration, q and I dependancies

- Data

- Statistical effects
  - Low counts, sparse data & zeros
- Instrument resolution effects
  - Dealing correctly with resolution
  - Geometric divergence & measured beam profile
  - $\Delta\lambda$ shape functions
- Re-binning effects
  - Can be considered as a resolution effect
- Calibration procedures
  - Absolute scale - direct beam via attenuators
    - relative to reference standard
  - q-scale
    - measure distances & geometry correctly
  - Timing errors - TOF, distances, detector 'thickness' etc.
    - Chopper timing
    - Beam cutting smearing
- Inelastic scattering effects
  - Solvents - Inelastic effects are definitely there
    - Is it a problem?

- Sample

- Do we know how to prepare & perform good experiments?

- Low-q scattering
  - Upturn in scattering at low q due to bubbles
  -
- High-q scattering
  - Detector issues (e.g. parallax)
  - Instrument geometry
  - Transmission path lengths

- Bad sample preparation / Instrument configuration
  - Under filled cells – beam hits meniscus
  - Aggregation & Sedimentation
  - Beam hitting cell walls
  - Dirty cells
  - Reflections from crystal edges