

Discussion: Measurement and Instrumentation

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Discussion: Measurement and Instrumentation

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1. Epithermal Neutron Instrumentation at ISIS (Giuseppe Gorini, Milano, Italy)

Dr Parker opened the discussion of the lecture by Prof Gorini: What are the lightest elements that NRT/NRCA can measure?

Prof Gorini replied: We have compiled a periodic table showing good, bad and 'no' elements, according to their detection sensitivity of the techniques.

Dr Krzystyniak communicated: Do you have plans for thermography studies using NRT/NRCA?

Prof Gorini communicated in response: There are no plans for T measurements at present, but other groups in Japan are exploring the feasibility.

2. VESUVIO Now/VESUVIO When? (Andrew Seel, STFC, UK)

Dr Ceriotti opened the discussion of the lecture by Dr Seel: It seems that there are different approaches around for performing the fitting of the $n(p)$ to the NCS data: 1. Fit the raw data from individual detectors and average the kinetic energy (and/or other fit parameters) obtained from individual channels; 2. Average groups of detectors with similar properties and fit the averaged data; 3. Fit to all the individual channels simultaneously. What are the differences of



these approaches?

Dr Seel replied: Individual, detector-by-detector fits can be thought of as the traditional way of analysing data from VESUVIO, since the detector geometry determines the transform of mass specific neutron Compton profiles from y -space to time-of-flight. In fact the initial tests on the reliability of y -scaling for subsequent analysis was dependant upon this approach. This approach is limited by the levels of noise in VESUVIO spectra (the instrument is flux limited), as is a global fit of the same $J(y)$ to each detector simultaneously. However, for the case of heavier masses, the recoil position and peak widths vary little across small detector ranges, allowing for the possibility to direct sum spectra in time-of-flight, and fit to $J(y)$ transformed using an average of the detector geometries. This would enable more stable fits across the instrument, effectively reducing the noise of the measured spectra.

Dr Seel further communicated in response: VESUVIO is limited principally by flux, necessitating long counting times (of the order of 15-24 hours). An improvement of even a factor of two through the upgrade of the ISIS target-station would revolutionise the way science is conducted on VESUVIO.

Prof Fernandez-Alonso commented: Such upgrades could provide possible improvement factors of 10 or even 100.

Dr Walewski queried: Why it is not possible to get constant q scans on VESUVIO?

Dr Seel replied: This is principally a geometry problem, bearing in mind we operate in inverted geometry and need to cycle secondary analyser foils in the scattered beam for each detector. The use of y -scaling overcomes the issue of constant q , and allows us to probe measurable properties such as momentum distributions and mean kinetic energies of interest to the community.

3. Direct and Inverse Geometry Instruments for Proton Momentum Distribution Studies (Roberto Senesi, Rome, Italy)

Prof Andreani opened the discussion of the lecture by Dr Senesi: Why not using the positive y -side of NCP from SEQUOIA to compare with the positive one from VESUVIO?

Dr Senesi replied: This is a good suggestion, and this test will be carried out.

Dr Seel communicated: What is the magnitude of FSEs on SEQUOIA, compared to VESUVIO?

Dr Senesi communicated in response: At wave vector values between 20 and 30 \AA^{-1} , we were able to detect only the $\frac{1}{q}$ -term.

Dr Krzystyniak commented: The y -range accessed on VESUVIO is limited on positive high y -values, while the opposite is true for SEQUOIA.