

## Supplementary Information:

### Mobility of bound water in PNIPAM microgels

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The QENS spectra for different temperatures and different  $q$ -values and some auxiliary plots are presented in this document. The different constituents of the fit function are presented in Figure 1. Figure 2 shows the fit parameters for the humidified microgel at 323 K. Figures 3-5 show the QENS spectra for the two samples at  $q$ -values. Figure 6 illustrates temperature dependence of amplitude and relaxation time of dried microgels, in case the amplitudes are fitted as well.

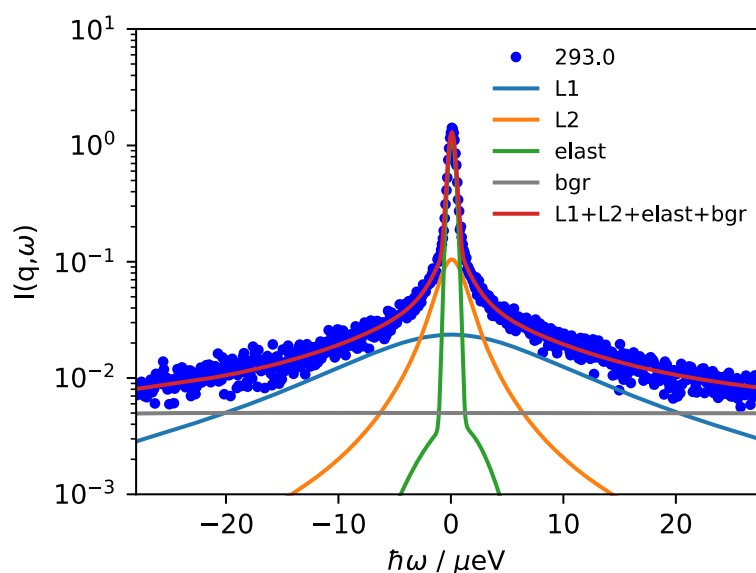


Figure 1: Components of the fit function for a representative QENS spectrum at 293K of the humidified microgel. The fit comprises two Lorentzians L1 and L2, an elastic contribution from the immobile protons and a background contribution.

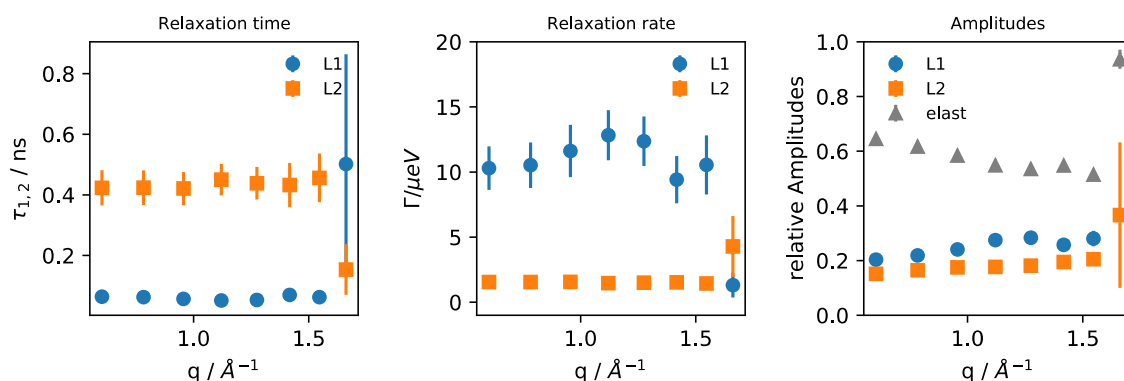


Figure 2: Fit parameters for the humidified microgel at 323K.

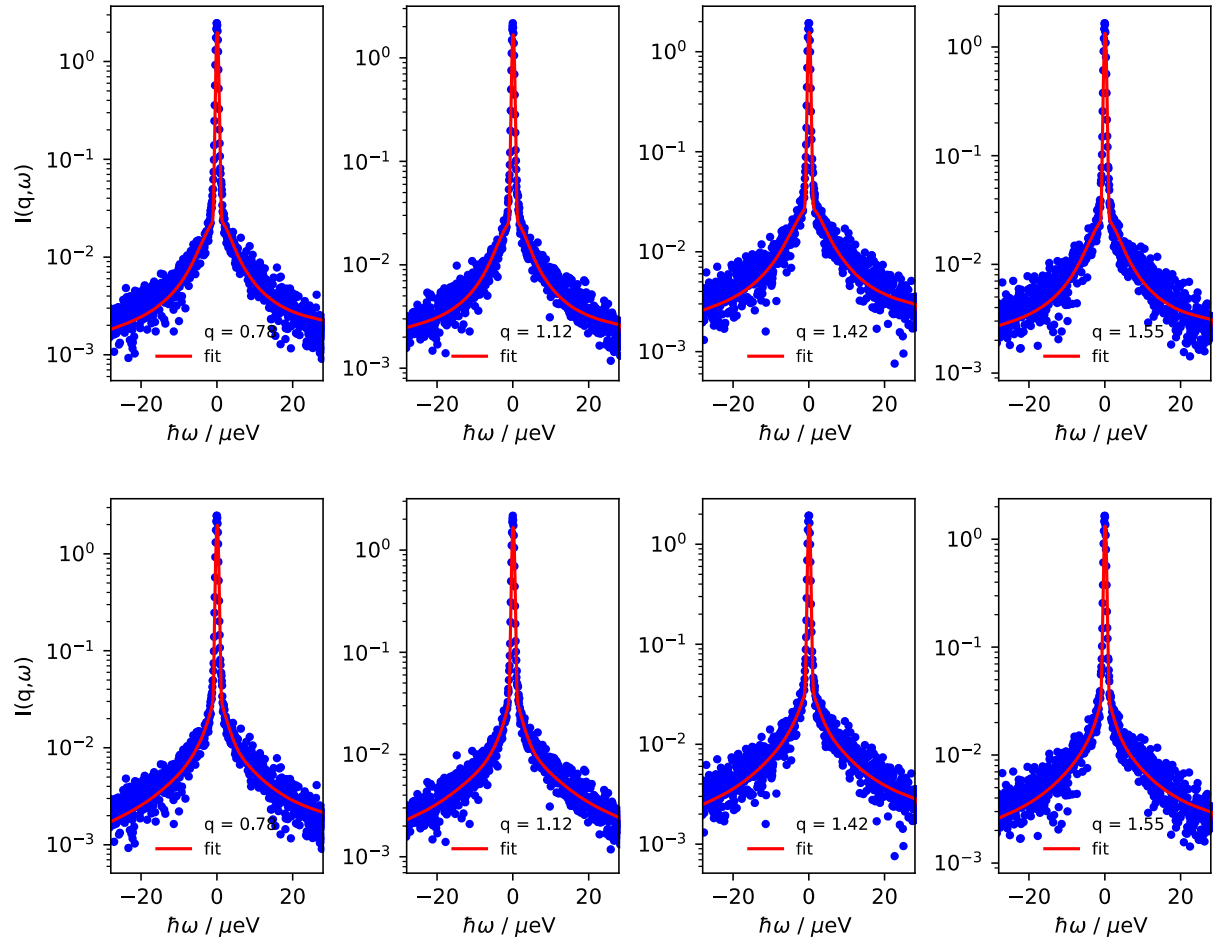


Figure 3: QENS spectra for the dry microgel at 293K at 4 different  $q$ -values with 1 Lorentzian contribution (top) and two Lorentzian contributions (bottom). The chisquare is almost identical; it was therefore decided to take only one single Lorentzian function for the dry PNIPAM sample.

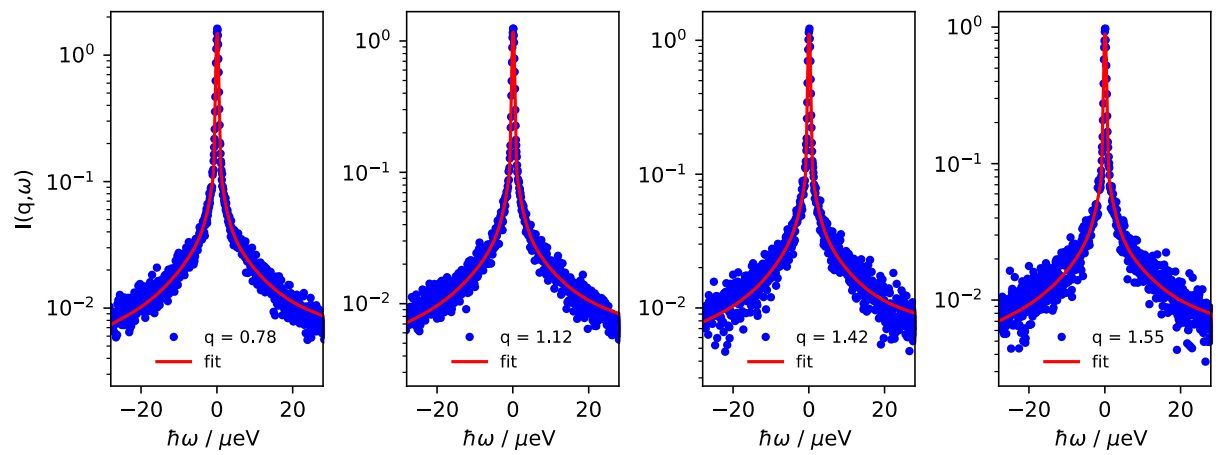


Figure 4: QENS spectra of the humidified microgel at 293K for different  $q$  values.

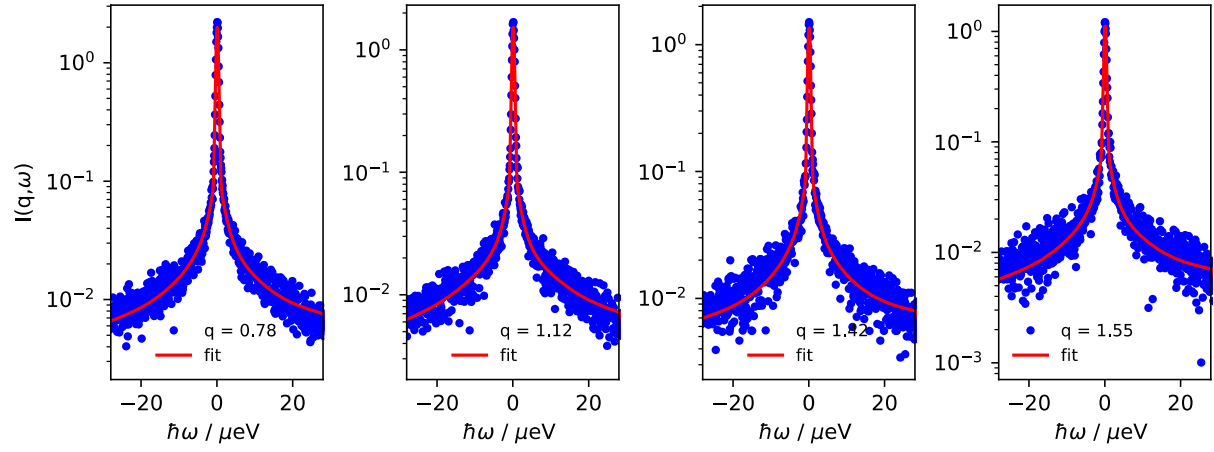


Figure 5: QENS spectra of the humidified microgel at 323 K at 4 different  $q$  values

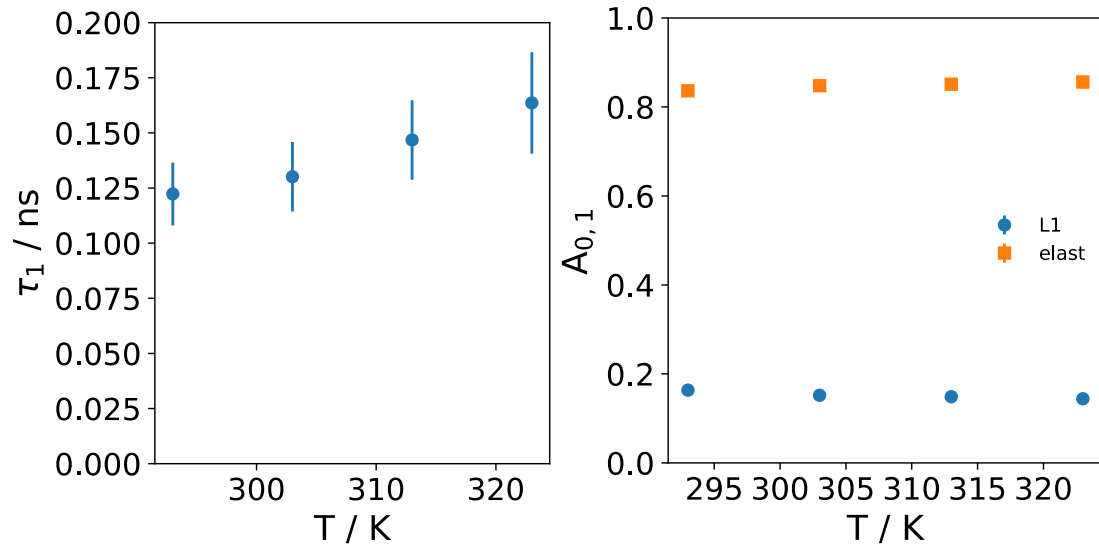


Figure 6: Temperature dependence of Amplitude and relaxation time of dried microgels, if the amplitudes are fitted as well. Then the relaxation time slightly increases, but still only very slightly.