1 LDA results for $\bar{S}_\pi$ vs. U/t

In this third report we show LDA results vs. U/t which can be compared directly with our experimental measurements. We are interested in the optimal Bragg scattering signal that was obtained for each value of U/t, as shown in the S_π vs. U/t figure in the paper. We remind everybody that, for each value of U/t, Bragg scattering was optimized by varying the atom number.

The variation of the optimal atom number with U/t is shown in Fig. 1. We only took data at four of the seven points shown there, but in order to get smoother LDA curves we added values of U/t, N in between every two experimental data points.

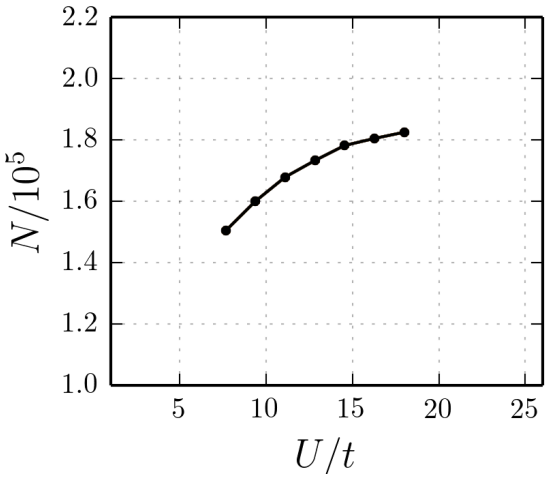

Figure 1: U/t and N used to produce LDA results and compare to the experimental data.

The comparison with experimental data is shown in Fig. 2. The LDA curves are obtained for constant T. In the last report we emphasized that obtaining this results at constant entropy per particle S/N would make more sense, so we were surprised by the fact the the LDA at constant T agrees well with the data.

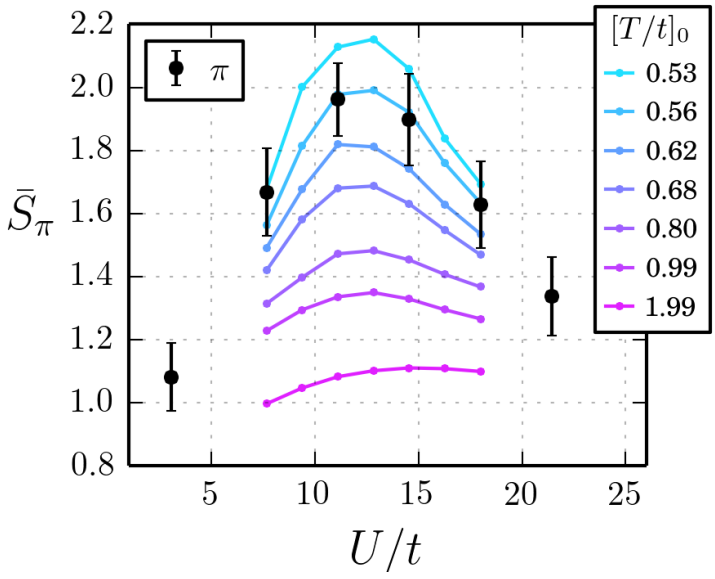

Figure 2: Experimental data alongside LDA results.

For the LDA points at which all of the necessary QMC entropy data is available, we calculated the overall entropy to get an idea of what kind of entropy variation we get at constant T when varying U/t and N as we do here. The result is shown in Fig. 3. What we see is that the slope of this S/N curves is not too large, so for our data the difference between constant T and constant S/N is going to be small and perhaps negligible.

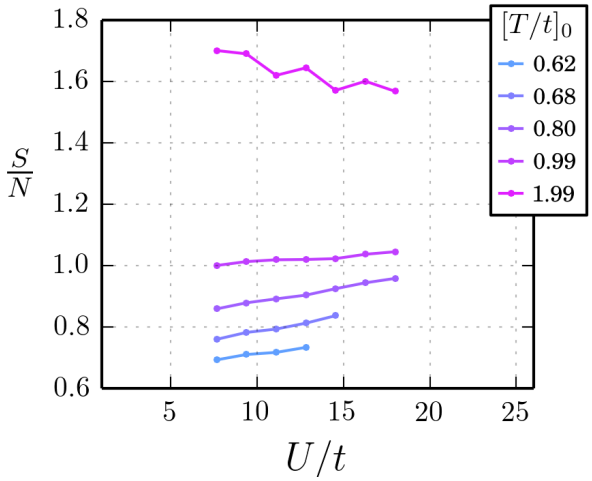

Figure 3: Overall entropy per particle S/N for LDA results.

Finally, please notice that in the plots shown in this report we are using $[T/t]_0$, which is the local value of T/t at the center of the trap. We could also use $[T/t]^*$, which is the local value of T/t at the radius at which S_π is maximized.