



	<b>Experiment title:</b> Compton Double Ionization of Helium at High Energy	<b>Experiment number:</b> CH-225
<b>Beamline:</b> ID15	<b>Date of experiment:</b> from: 11.12.96 to: 17.12.96	<b>Date of report:</b> 1.3.97
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**Report:**

The results of the two recent experiments on the Compton Double Ionization of Helium at High Energies were reported in the ESRF Highlight 1995/96 on page 60-61. The Experiments concentrated on the question of the exact value of the double to single ionization  $R_c$ . In this respect both experiments differed still by 30% showing the necessity for future experiments with better statistics and at even higher energies.

Our last beamtime at ID15 was dedicated to this task. This experiment was made possible by the tremendous improvements obtained by the beamline scientists with respect to the intensity of the photon beam. The photon flux was enhanced by an order of magnitude. The achieved statistics allowed more cross checks for the possible sources of systematic errors. In addition a first data point at 100 keV, although with less good statistics could be taken. The results are shown in figure 1. This figure contains besides our new measurement the results of the two former experiments and further new experimental data taken by other groups at lower energies. The grey area gives the range of possible ratio values considering the error bars of the measurements and a smooth behavior of the ratio  $R$ , with the photon energy.

Our results indicate that the ratio  $R_c$  did not reach the asymptotic value of 0.8% and seems also to be slightly outside of the interval  $0.84 \pm 0.08$  given by Spielberger et al.

### Helium double- to single ionization

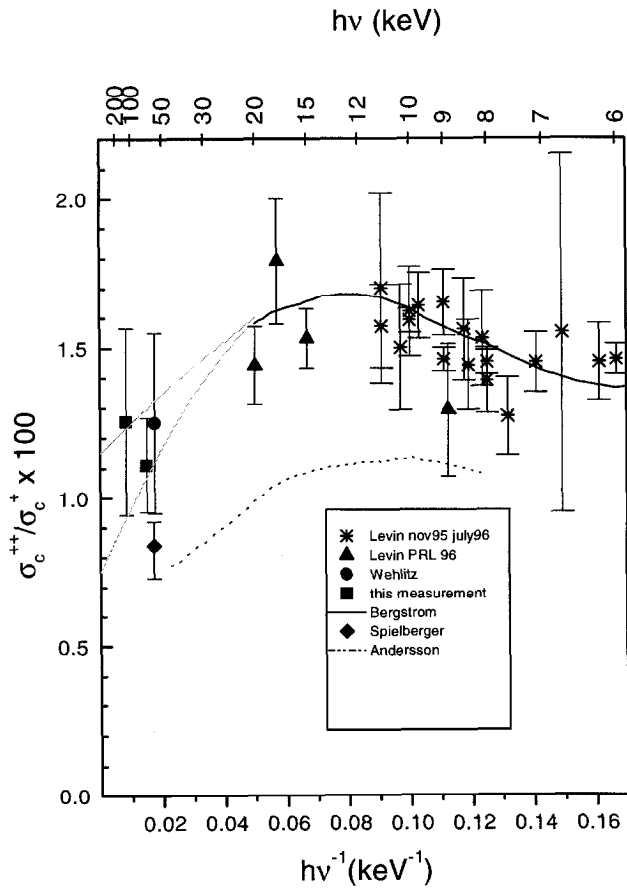


Figure 1

This result suggests a further experiment with better statistics at 100 keV and may be even higher. An extension to other rare gases than He is suggested in a corresponding application for beam time.