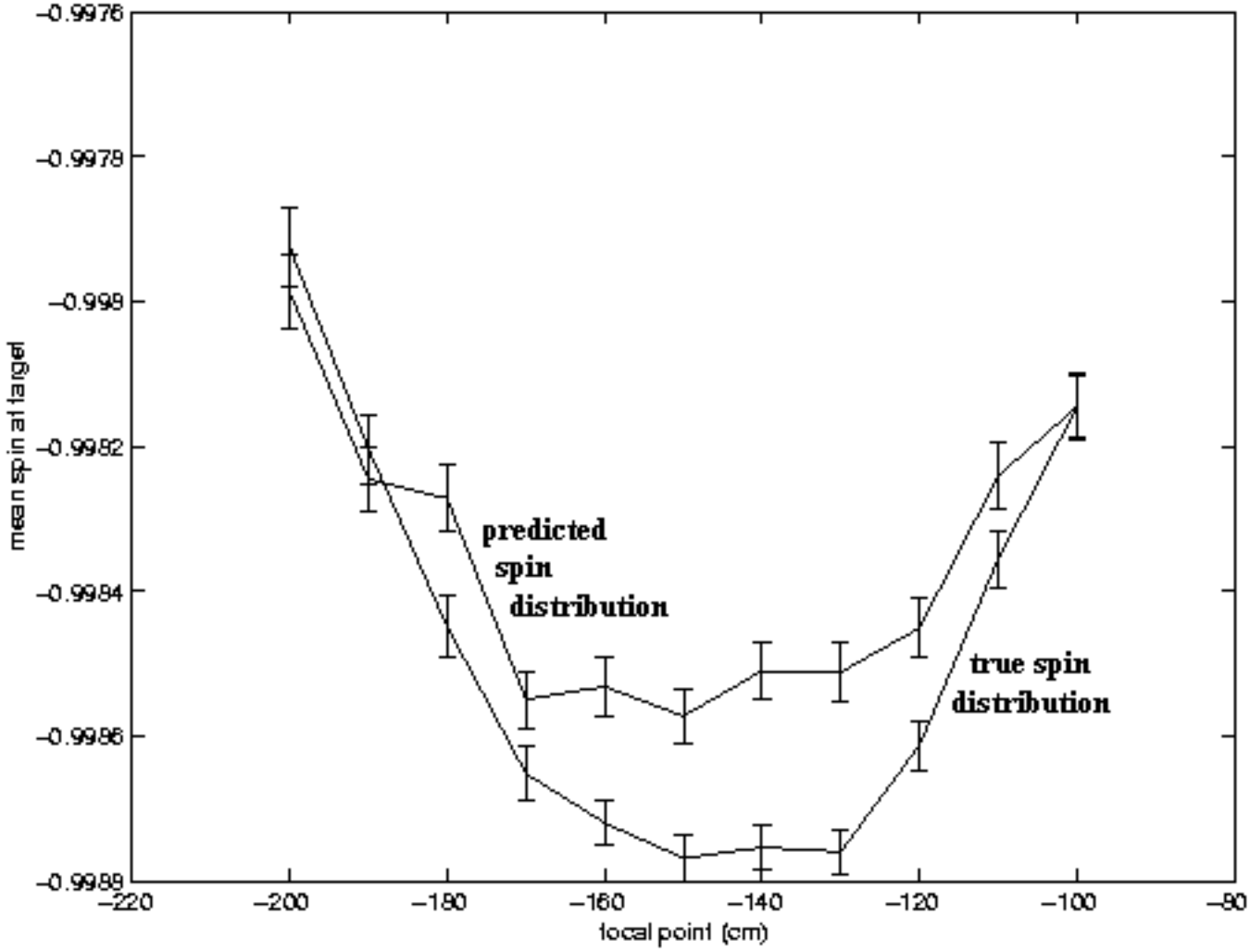

Figure 6: the impact of the focal point on the mean z component of the muon spin (polarization) at the target, where the focal point of the incoming beam of muons is relative to the center of the stopping target. The predicted spin distribution as a function of focal position is also shown alongside the true distribution. The discrepancy between the two curves may be due to the inability to accurately predict muon spin as helices become more difficult to fit (which occurs when helix radii are small, or equivalently, as muon polarization becomes more ideal). Two thousand events were run at each focal position to gain the data; chi-squared cuts were applied on each run to eliminate bad fits. The predicted spin was calculated as: predicted spin = -cos(arctan(rad*akn)), where rad is the helix radius is centimeters, and akn is the wavenumber in centimeters-1. Clearly, the optimal focal position is at approximately -150 centimeters. Error bars shown are from the RMS values for each data point divided by the square root of the number of events contributing to the point.