Minutes of informal CSB collaboration meeting 10/29, by Jerry Miller

In attendance: Andy Bacher, Anders Gardestig, Chuck Horowitz, Jerry Miller, Ed Stephenson
also attending: Charlotte Elster, Pieter Maris, Anna Micherdzinska

The meeting began with a discussion of the recent results of Andreas and Antonio's calculations. Everyone was impressed with the ability to do these kinds of calculations for so many diagrams. A summary of the numbers included the statements:

The Weinberg term is sensitive to the d, and He wave functions used. This problem is alleviated only slightly by cutting off the high momentum parts of the virtual pion wave function. The spread in computed cross sections is a factor of about 30 in plane wave approximation, mainly because the term vanishes using a simple wave function. When initial state interactions ISI are included, the cross section is enhanced by a factor of about 40 and the spread is reduced to about a factor of 5-7, depending on the value of delta m used. The recoil correction term is enhanced by a factor of 7 by ISI.

In contrast, the one body term is not very sensitive to the wave functions: there is only 20% differences between the PWA calculations. These cross sections are enhanced by a factor of three by ISI.

For sigma exchange, the PWA calculations differ by a factor of 2. These cross sections are enhanced by a factor of 6 by ISI, and the spread remains a factor of 2. The real part of the rescattering amplitude interferes desctructively with the PWA term, changing its overall sign, but not the magnitude. The general features of this pattern are obtained also for vector meson exchange: rho, omega, rho-omega. Rho-omega is the largest. Cross sections are enhanced by a factor of 3 due to ISI.

The effects of CSB in the He wave function are fairly small and vary only by 30-40% in the cross section.

When all of the effects are computed together, the cross sections are about 50 times too high. This makes it rather difficult to publish at this stage. We need to find some new ideas.

Points of discussion:

1. Suppose we set the strong eta-nucleon coupling constant to 0, what cross section would be obtained? Is this the quick way to get the size of the computed cross sections down to the data?

2. Parameters (both strong and csb) could be constrained by the np to dpi reaction. Anders and Chuck (together with Charlotte Elster and Daniel Phillips) are doing this.

3. The effects of class IV CSB forces in the initial state interaction needs to be investigated. This could cancel the imaginary parts of the other prescattering contributions. The group thought this was a good idea. Jerry has computed the effects of the gamma exchange, and Andreas is looking at putting it into the calculation.

4. Charlotte raised the issue of whether the initial state interaction was fully conserved. The N ^{3}He scattering is not well approximated by single scattering. Is this accurate enough for present purposes?

5. Anna M (IUCF) presented the dd elastic scattering. The present T20, T11 and T22 as well as cross section data were shown. This heightened interest in the subject.