Last time we discussed in detail how to calculate Clebsch-Gordon coefficients for SU(2), the representation of the group elements, including the completeness and orthogonality integrals, and the relation to spherical harmonics and the Wigner-Eckhart theorem that separated the rotational dependence from the reduced matrix element which carries the interesting physics.

Then we introduced isospin and the idea that hadronic states formed isotopic spin multiplets. Today we will see that applying the Wigner-Eckhart theorem to the scattering amplitude will relate many different scattering processes that can be described by a much smaller number of reduced amplitudes, and we will also see that decomposing the scattering into their reduced elements displays the existence of resonant states. With a hint that larger symmetries might give even more impressive relationships, we take a break from data to ask what we can say about all symmetry groups of this type, which leads us to Chapter 5: Semisimple Compact Lie Groups and their representations. We will see that the kind of analysis we did for finite-dimensional representations of SU(2) will lead not only to how to construct all of these representations for larger groups but also what larger groups there are.

Reminders:

We meet again tomorrow, Wednesday Feb. 24, in ARC 212, and then again on Friday in 203. Next week classes are on the normal schedule.

I intend to give you a midterm exam on Tuesday, March 8. I currently think this will cover the material from the beginning through Dynkin diagrams (Chapter 8), but we might modify that as we get closer to the exam.

Homework 5 is due Thursday, Feb. 25.

Homework 6 will be due Thursday, March 3. It will be posted by this Thursday.