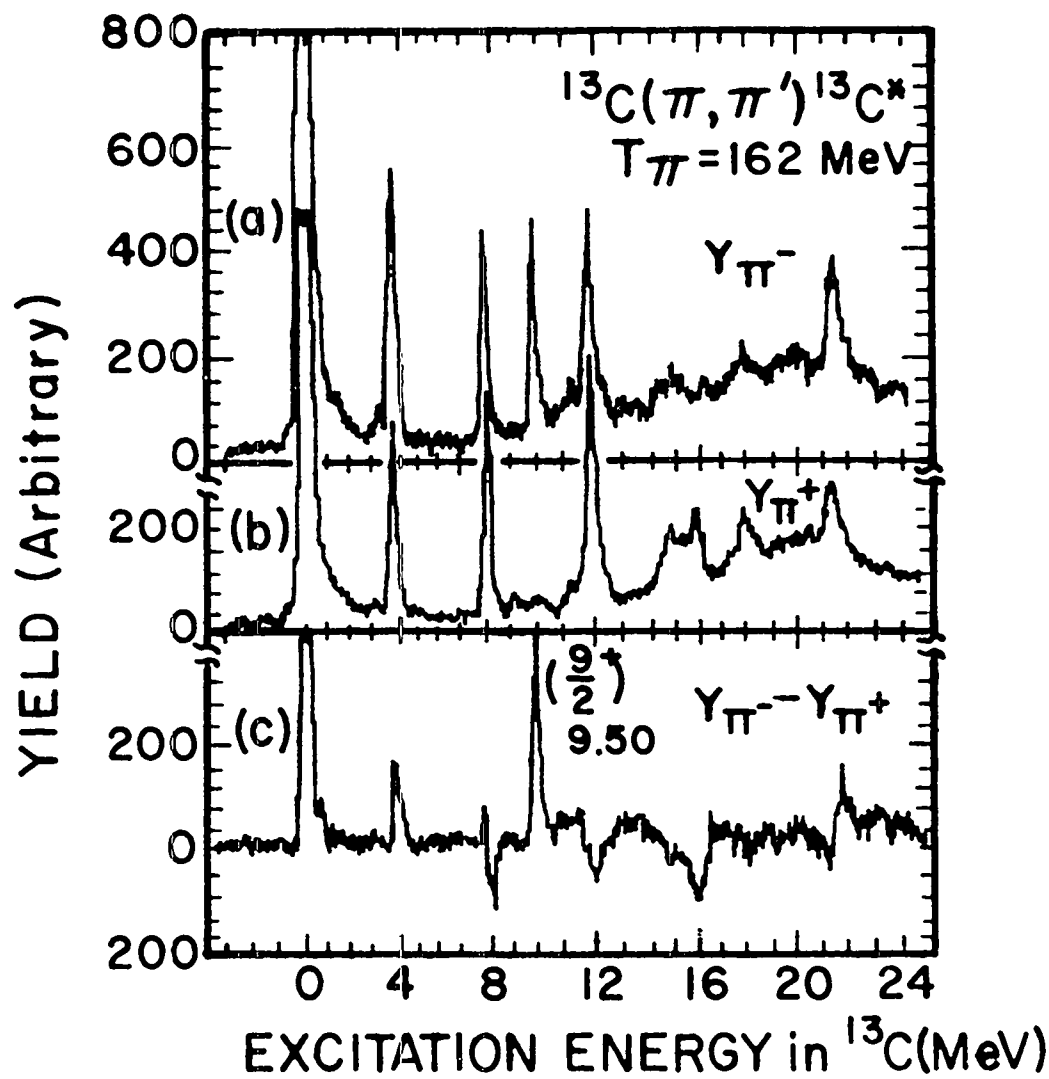
decade after its commissioning, some 600 experiments have been completed. Perhaps 20 per cent of them deal with pion reactions at energies in the resonance region and the properties of the delta, namely its strong characteristic resonance. Other experiments deal with the I-spin and spin characteristics of nuclei. I have selected only a few examples.

The EPICS system at LAMPF consists of a pion channel, a target chamber, and a spectrometer with a resolution of about 150 KeV, which makes possible the study of the angular distribution of pions scattered elastically or scattered with excitation of individual levels in the residual nucleus. An interesting nucleus to look at is ^{13}C, which, according to the shell model, has a ground state that may be roughly considered as a ^{12}C core plus an extra neutron ($1/2^-$). The measured yield of negative pions and the yields of positive pions are plotted as a function of excitation energy. The data indicate that the ratio is very closely 9 : 1 for a state at 9.5-MeV excitation in ^{13}C, just the same ratio we get for a single free neutron, as we discussed earlier. Without giving details here, the overall nuclear physics picture is consistent with this line corresponding to a transition to a state consisting of a 2^+ excitation of the ^{12}C core coupled to a $d_{5/2}$ neutron to give overall $9/2^+$. The literature gives a more careful account, but this seems to be a textbook example of a free neutron-like transition. Like many textbook examples, it is quite rare. Very few levels give 9 : 1 ratios. Most levels in odd-A nuclei require more complicated descriptions, involving strong admixtures of particle-hole configurations. Pion inelastic scattering nevertheless appears to be a very useful tool in sorting out these questions.



Yields of inelastically scattered pions from ^{13}C as a function of ^{13}C excitation energy. Graph (a) shows the negative pion yield; (b) shows the positive pion yield; (c), the difference of the two yields. Notice that a strong peak at about 9.5 MeV in the negative pion yield is nearly absent in the positive pion yield. The 9.5-MeV line is assigned angular momentum and parity ($\frac{9}{2}^+$). The ratio of the two intensities turns out to be approximately 9 : 1.