A second example concerns the energy dependence of the angular distributions in the scattering of π^+ on ^{40}Ca. At the resonance energy, namely 180 MeV, the figure shows a classical diffraction pattern for a black disc, namely, $J_1^2(kR)$. This implies that the nucleus is absorbing all pions that fall on it, so the nucleus appears black in the light of the pions. Above or below the resonance energy the diffraction minima are filled in, as the nucleus becomes more transparent, expecially for the lighter nuclei.

And now...

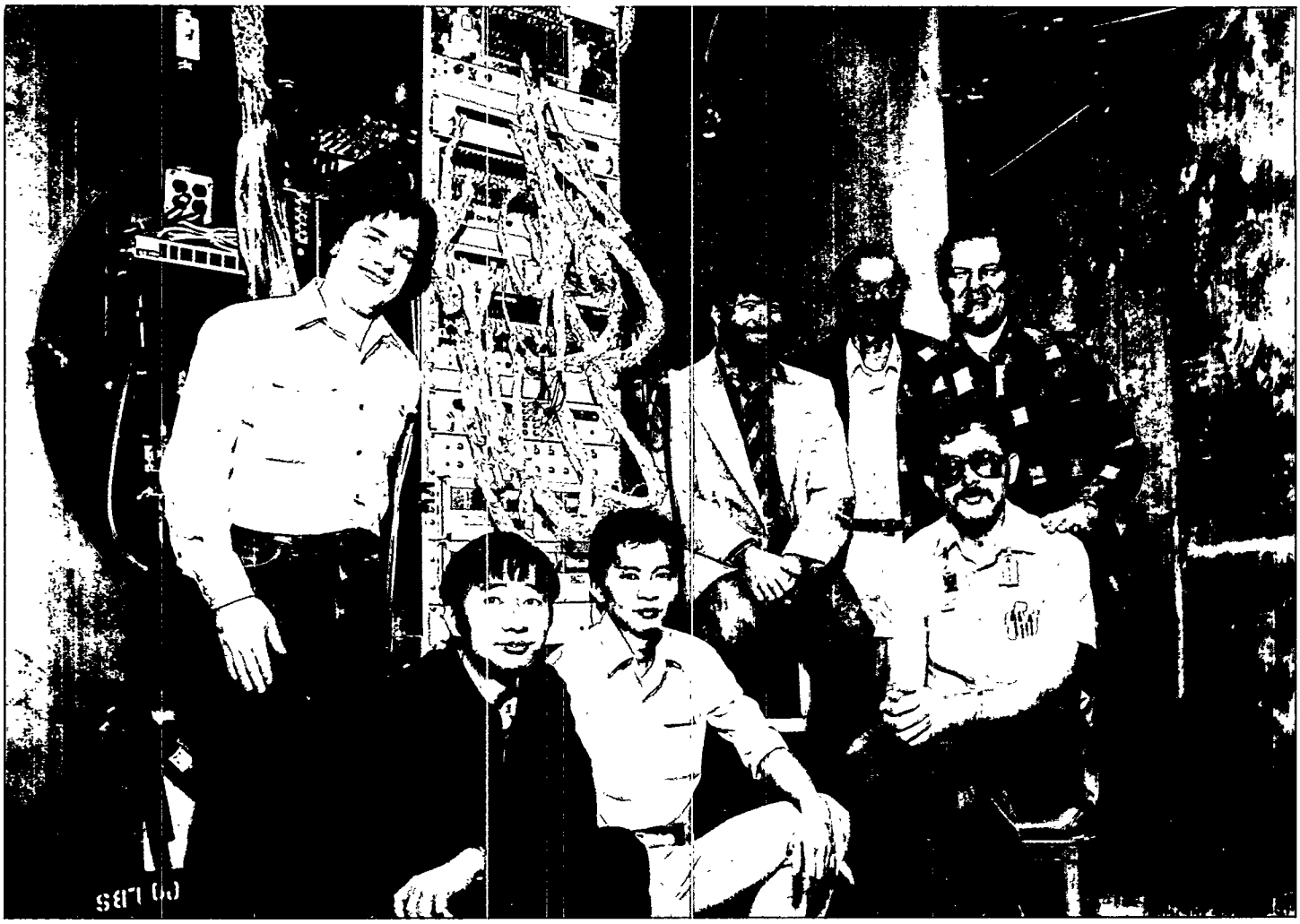
An interesting question at present is—are there delta-hole components in the wave functions of nuclei? Some evidence supporting this idea has been brought forward, but it is a matter of active discussion how large is the contribution of delta-hole components. Another question is—is there a collective delta-hole giant resonance at about 300 MeV? Here also evidence exists, but the question is not settled.

Another exciting recent discovery is that of David Bowman and his colleagues, working with the pion charge-exchange reaction on nuclei in the resonance region. They have seen the isovector monopole giant resonance for the first time. The location of the resonance, its width, and the associated angular distribution are about as predicted.

Herb's current experiment at LAMPF (with Wayne Kinnison, Robert McKee, Clifford Hargrove, and John Lillberg) is the study of the beta decay spectrum of the muon. The basic detector is a time projection chamber, and the goal is a tenfold improvement in the accuracy of the Michel parameters that characterize the beta spectrum.

Thirty years later medium energy physics, the delta, and Herb are all vigorous and busy.

Herb's current experiment: parameters of muon decay. M. Peters, T. Susuki, M. J. Young, Wayne Kinnison, R. McKee, C. Geisik, and L. Lillberg are shown (L to R).



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