Second, the branching fraction for

$$\begin{aligned} \tau^- \rightarrow \nu_\tau + \rho^- &\rightarrow \nu_\tau + \pi^- + \pi^0 \\ &\rightarrow \nu_\tau + \pi^- + \gamma + \gamma \end{aligned} \tag{10a}$$

could be calculated from the cross section for

$$e^+ + e^- \rightarrow \rho^0 \tag{10b}$$

and was found to be

$$B(\tau^- \rightarrow \nu_\tau \rho^-) \approx 20\% \tag{10c}$$

One of the problems in the years 1977–1979 in finding the modes in Eqs.9a and 10a was the poor efficiency for photon detection in the early detectors. If the γ's in Eq.10a are not detected then the π and ρ modes are confused with each other. Probably the first separation of these modes was achieved using the Mark I–Lead Glass Wall detector. As reported at the *Hamburg Conference* by Angelina Barbaro-Galtieri.[47]

$$B(\tau^- \rightarrow \nu_\tau \pi^-)/B(\tau^- \rightarrow \nu_\tau \rho^-) = 0.44 \pm 0.37$$

Gradually the experimenters understood the photon detection efficiency of their experiments and in addition new detectors, such as the Mark II, with improved photon detection efficiency were put into operation.

In our collaboration the first demonstration that $B(\tau \rightarrow \nu_\tau \pi^-)$ was substantial came from Gail Hanson[48] in an internal note dated March 7, 1978. She looked at a sample of 2-prong, 0-photon events with one high-momentum prong. Figure 9 taken from her internal note shows an excess of events, particularly at large x, if $B(\tau \rightarrow \nu_\tau \pi^-)$ is taken as zero.

Within about a year the $\tau \rightarrow \nu_\tau \pi^-$ decay mode had been detected and measured by experimenters using the PLUTO detector, the DELCO detector, the Mark I–Lead Glass Wall