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How Many Degrees of Freedom are Required to Describe Baryon Resonances? JOSEPH KISH, Abilene Christian University, MIPP COLLABORATION — In quark models the number of baryon excited states predicted depends only on the number of degrees of freedom. Simplified quark-diquark models describe all the observed resonance states considerably well. However, standard 3-quark models have additional degrees of freedom that predict a greater number of excited states than have been observed. In order to solve the mystery of the “missing baryons”, gain a better understanding of nucleon structure/dynamics and arrive at a consistent quark model, accurate data are essential. Recent proposed upgrades to the Main Injector Particle Production experiment (MIPP) at Fermilab will facilitate baryon spectroscopy by scanning the mass region from 1.5 to 2.5 GeV/c² while simultaneously measuring elastic and inelastic channels such as $\pi^- p \rightarrow \pi^+ \pi^- n$ and $\pi^- p \rightarrow K^0 \Lambda$. A description of MIPP will be presented, including proposed improvements to the DAQ, lower momentum capabilities, additional plastic ball backscatter detector and upgraded veto hodoscope, as well as the theoretical motivation and expected results.

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