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In two recent experiments the large gamma-ray spectrometer array, GAMMASPHERE, was used to identify gamma decays from high-spin states in the mirror-pair nuclei  $^{53}_{27}\text{Co}_{26}$  and  $^{53}_{26}\text{Fe}_{27}$ . The reaction  $^{32}\text{S} + ^{24}\text{Mg} \rightarrow ^{56}\text{Ni}^*$  at a beam energy of 95MeV was used in the first instance, with reaction channel selection afforded by the FRAGMENT MASS ANALYSER recoil separator and an ion-chamber. In the second instance the reaction  $^{32}\text{S} + ^{28}\text{Si} \rightarrow ^{60}\text{Zn}^*$  at a beam energy of 125MeV was used, with channel selection provided by the MICROBALL light charged particle detector and NEUTRON SHELL neutron detector.

States up to the  $f_{7/2}$ -shell band termination of  $J^\pi = \frac{19}{2}^-$  were identified in both A=53 mirror-pair nuclei, and the Coulomb Energy Difference (CED) was calculated as  $E_x(^{53}\text{Co}) - E_x(^{53}\text{Fe})$  for each level throughout the entire spin range. Changes in the CED will be interpreted in terms of non-collective particle alignment effects. The CED will also be compared to the results of large-scale shell-model calculations in the full- $fp$  valence space. A discussion of the physical significance of the Coulomb Matrix Elements used in the calculations will be presented, and the results of a fit of the measured CED to these Matrix elements will be shown.