Search for *E*0 transitions in ^{54}Mn via electron-pair spectroscopy

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The low energy structure of nuclei close to the doubly magic ^{40}Ca and ^{56}Ni are driven by collective excitations, including shape coexistence and super-deformation [1]. On the other hand, the N=28 shell closure is also strongly influencing the nuclei between N=Z=20 and 28. Electric monopole, E0 transitions are often cited as excellent probes to explore the interactions of collective excitations with different deformations. Strong E0 transitions are reported in ^{54}Fe [2] and in ^{52}Cr [3], however most of the E0 transitions in the region has not been observed. We shall report on a detailed conversion electron and electron-positron pair conversion study of ^{54}Mn, a N=29, Z=25 nucleus next to ^{52}Cr and ^{54}Fe. Excited states up to about 3 MeV energy have been populated using the ^{54}Cr(p,n)^{54}Mn reaction at 5.4 MeV bombarding energy at the ANU HIAS accelerator. Electron and electron-positron pair conversion coefficients have been measured with the Super-e spectrometer [4]. The 1579 keV transition from the 1634 keV 2^+ state has a conversion coefficient larger than the pure M1 or E2 value, indicating a significant E0 contribution. In this talk we describe the experiments and will present a preliminary interpretation of the results.

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