The Physics-Rich World of N = Z Nuclei from Nickel to Tin*

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N = Z nuclei above ^{56}Ni play a central role in our quest to generalize our understanding of nuclear structure and apply that knowledge to nucleosynthesis. One sensitive test of structure has been measuring shell-driven shape polarization in these nuclei, which continues to reveal interesting physics and has been shown to be responsible for determining the trajectory of the proton dripline. New facets are emerging as interesting topics which can now be investigated. The T = 1 and T = 0 np-pairing modes may be unique to these nuclei and might influence their structure, both in even-even and odd-odd nuclei. The demise of the purity of their isospin symmetry can be investigated in detail, both "in-beam" and through its influence on beta decay. Superallowed Fermi decays provide a sensitive test of fundamental symmetries. In this region the N = Z line moves close to the proton dripline, so new decay modes involving particle decay can become important. Mirror symmetry and Coulomb shifts can also be examined in these weakly bound nuclei, which become more interesting as the dripline is reached. Finally, these nuclei lie along the rp nucleosynthesis path which is now thought to extend beyond tin, so decay modes, energies and rates are of special interest as they dictate synthesis rates and abundances. Some examples of the current status of research and the prospects for the future with radioactive beams will be presented.

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