

## Selected Topics in the Structure of Exotic Nuclei\*

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A central theme of study in current nuclear physics research is the structure of *exotic nuclei*. How does the shell structure evolve with isospin? What are the elementary modes of excitation in neutron rich nuclei? Is there isoscalar neutron-proton pairing along the  $N=Z$  line? What is the structure of the very heavy elements? are among the questions we are trying to answer.

The worldwide development of radioactive beam facilities and detector systems with increased sensitivity and resolving power has provided the tools needed to produce and study nuclei far from the stability line.

In this talk I will discuss some recent results from our group at Berkeley that can shed light on the questions above. They include: i) Experiments carried out at NSCL/MSU to measure the lifetime of the  $2+$  states in neutron rich carbon isotopes. The  $B(E2)$ 's can provide important information on the neutron effective charges and the possible decoupling from the core, ii) The two proton knock-out reaction from  $^{32}\text{Mg}$  into  $^{30}\text{Ne}$  relevant to the understanding of intruder configurations in the island of inversion and the effects of weak binding, iii) A study of the  $^{44}\text{Ti}(^3\text{He},p)$  at the ATLAS facility at ANL to address the question of  $np$  pairing, and iv) Isomer spectroscopy of transfermium nuclei using the BGS at the 88-Inch Cyclotron.

In recent years we have been leading the US effort in the development of the gamma-ray tracking technique. I will end this presentation with a short review of the current status of GRETINA and of the exiting physics opportunities that will be possible with this instrument.

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