

# Searching for Low-Energy Shape Coexistence in $^{80}\text{Ge}$

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Study of nuclear structure around the magic numbers is key to understanding the chart of nuclei. The region around  $^{78}\text{Ni}$  is of interest, not only because it is one of the heavier doubly magic nuclei, but also because it has been proposed as a portal to the fifth island of inversion [Nowacki, F. *et al.* Phys. Rev. Lett. 117, 272501]. Evidence for low-lying shape coexistence near  $N=40$  has been observed, but, until recently, no evidence of low-lying  $0_2^+$  states in the Ge isotopes near  $N=50$  had been reported. An experiment at the ALTO facility identified a  $0_2^+$  state at 639 keV above the  $0^+$  ground state in  $^{80}\text{Ge}$  [Gottardo, A. *et al.* Phys. Rev. Lett. 116, 182501]. However,  $\beta$ -decay studies using the GRIFFIN facility at TRIUMF, show no evidence for this state. Furthermore, the decay of a proposed ( $2^+$ ) 2403-keV state to the  $0_2^+$  639-keV state was not observed, nor was there other evidence for this state. Large-scale shell model calculations were performed, using two different valence spaces and interactions, for  $^{78,80,82}\text{Ge}$ . These calculations were able to reproduce the energies of known  $0_2^+$ ,  $2_{1,2}^+$  and  $4_1^+$  levels in these Ge isotopes. The  $0_2^+$  state in  $^{80}\text{Ge}$  is predicted to be near 2 MeV and arises from the recoupling of valence particles. The search for this state, will be described, and the recently published findings [Garcia, F.H. *et al.* Phys. Rev. Lett. 125, 172501] will be presented.

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## Please select: Experiment or Theory

Experiment

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