Contribution ID: **175** Type: **Contributed talk**

Shape coexistence and superdeformation in ^{28}Si

Thursday, 11 July 2024 17:30 (20 minutes)

We study the shape coexistence in the nucleus ^{28}Si with the nuclear shell model using numerical diagonalizations complemented with variational calculations based on the projected generator-coordinate method. The calculated electric quadrupole transitions and moments and an analysis of the collective wavefunctions indicate that the standard USDB interaction in the sd shell describes well the ground-state oblate rotational band, but misses the experimental prolate rotational band.
Guided by the quasi-SU(3) model, we show that the prolate band can be reproduced either in the sd shell, but by reducing the energy of the $0d_{3/2}$ orbital, or in the extended $sdpf$ configuration space, by using the SDPF-NR interaction which also describes well other Si isotopes. Finally, we address the possibility of superdeformation in ^{28}Si within the $sdpf$ space. Our results disfavour the appearance of superdeformed states with excitation energy below 20 MeV.

session

I. Nuclear Structure and Reactions

Primary authors: FRYCZ, Dorian (University of Barcelona); MENÉNDEZ, Javier (University of Barcelona); RIOS HUGUET, Arnau (University of Barcelona)

Presenter: FRYCZ, Dorian (University of Barcelona)

Session Classification: I. Nuclear Structure and Reactions