Shell-model project for Nuclear Talent course - Solutions

Group 1

(Dated: July 16, 2017)

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^{18}O and ^{18}F

NushellX for $^{18-28}$O

NushellX for $^{18-29}$F

$^{30-31}F$

We test different effective interactions in $sd-pf$ shell using the $0f_{7/2}$ and $1p_{3/2}$ orbits.

Negative Parity for ^{25}O and ^{25}F

In the sd shell, all orbits are with positive parity and therefore negative parity states can not be calculated. Extending to the $sd-pf$ shell one might encounter some, however using the SDPF-K interaction, taking an ^{16}O core for the protons and freezing 12 neutrons in the sd shell (12 particle filling all the sd orbits) with extra 5 neutrons at the $0f_{7/2}$ and $1p_{3/2}$ orbits we still do not obtain negative parity states.

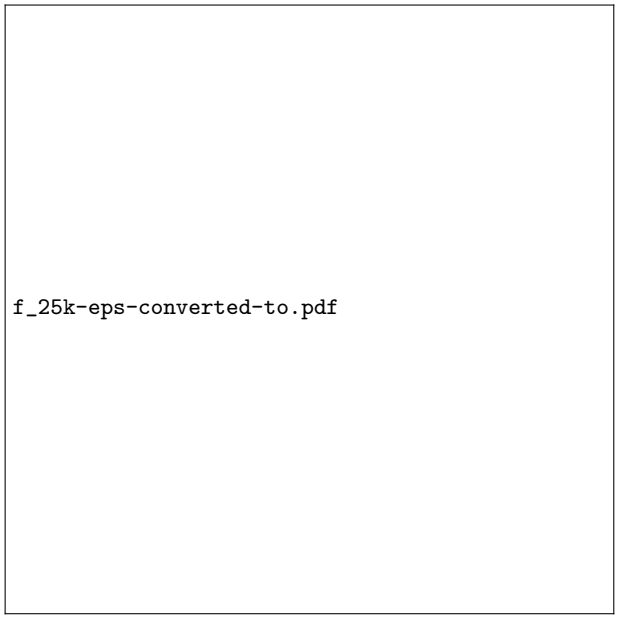

FIG. 1. test