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Nuclear structure study of the mirror nuclei 22ne and 22mg around the 21na+proton threshold

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A comparison of the structure properties of 22Ne and 22Mg is interesting because in nucleosynthesis 22Mg can be formed through the capture reaction 21Na(p,gamma) for which the cross sections will depend on spin-parity assignments of the 22Mg states around the proton-emission threshold .
For the pair 22Ne-22Mg, our calculations using the PSDPF interaction predict fifteen states in the excitation energy range up to ~ 6.35 MeV. Experimentally, fourteen states are reported in NNDC with well defined spin and parity for the 22Ne. Twelve of them have positive parity and two of them have negative parity. Concerning the 22Mg, sixteen states are reported, the majority of them having no fixed spin and parity.
In our contribution to the workshop, we will propose based on the shell model calculations a one to one level correspondence between 22Ne and 22Mg. In particular what the negative parity states are concerned, three states are identified in 22Ne: 2- at 5146 keV, 3- at 5910 keV and 0- at ~ 6234 keV, they correspond to the mirror states in 22Mg : 2- at 5006 keV, 3- at 5838 keV and 0- at 6046 keV.
Finally, we will present for the mirror nuclei 22Ne-22Mg, a comparison between the shell model predictions obtained by the interaction PSDPF+Coulomb and the experimental level schemes and electromagnetic transitions.

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