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## Some aspects of the structure of neutron-rich F isotopes in the Particle-Rotor Model

*Wednesday, 19 July 2023 11:50 (25 minutes)*

In this talk, we will discuss some aspects of the structure of neutron-rich F nuclei within the framework of the particle plus rotor model. Specifically, the low-lying structure of  $^{25,27,29}\text{F}$  can be understood in the rotation-aligned coupling scheme with their  $5/2+$  ground states as the bandhead of a decoupled band [1,2].

The excitation energies of the  $1/2+$  and  $9/2+$  states correlate strongly with the rotational energy of the effective core, seen by the odd proton, and allow us to estimate its  $2+$  energy. The Nilsson plus PRM picture suggests that the extra proton, with a dominant component in the down-sloping  $[220] \frac{1}{2}$  level polarizes the Oxygens and stabilizes its dynamic deformation. Thus, the effective cores could be interpreted as slightly deformed rotors with a modest  $\beta_2 \approx 0.15$ , as compared to the weak vibrational quadrupole collectivity in the real Oxygens.

Relevant to this interpretation are the recent studies of the  $^{25}\text{F}(p, 2p) ^{24}\text{O}$  and  $^{25}\text{F}(-1n \text{ KO})^{24}\text{O}$  reactions carried out at RIBF/RIKEN [3] and NSCL/MSU [4] respectively. Derived spectroscopic factors suggest that the effective core of  $^{25}\text{F}$  significantly differs from a free  $^{24}\text{O}$  nucleus. The observed fragmentation of the  $\pi d_{5/2}$  single-particle strength agrees with the PRM calculations and arises from the effects of deformation and core overlap.

We will also present preliminary two-particles plus rotor model of the odd-odd  $^{28,30}\text{F}$  [5,6] and discuss some further experiments that can shed further light on the validity of our interpretation.

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**Presenter:** MACCHIAVELLI, Augusto (Oak Ridge National Laboratory)

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