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Proton-neutron pairing and α-like quartet condensation in N=Z nuclei

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Proton-neutron pairing and α-like quartet condensation in N=Z nuclei
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A specific feature of N = Z nuclei is the occurrence of α -like quartet structures, composed by two neutrons and two protons, which have strong internal correlations and interact weakly with each other. Various studies have shown that the ground states of N=Z systems interacting by proton-neutron pairing interactions can be described by a condensate of α-like quartets [1-9]. This quartet condensate is the analogous of the Cooper pair condensate, commonly employed to treat the neutron or proton pairing correlations. As shown recently, the quartet condensation is also related to the band-like structures of even-even N=Z nuclei [10-11]. More precisely, the low-lying excitations of these nuclei are associated to the breaking of a quartet from the ground state quartet condensate and replacing it with an excited quartet.
In the first part of the talk I will present an overview of the issues mentioned above. Then I will discuss how the fingerprints of the α-like quartet condensation might show up in the α transfer reactions along a chain of even-even N=Z nuclei [12].

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