

SEMINAIRE DE LA DIVISION DE RECHERCHE

Nuclear Clusters and Molecules *Nuclear structure beyond the shell model*

Nuclear structure of nuclei in the valley of stability is determined by the mean field concept, where protons and neutrons create their own potential. These nuclei are described by the shell model. In contrast weakly bound nuclear systems, e.g. light nuclei off the stability valley, show strong deviations from the shell model due to clustering. Weakly bound states in nuclei will therefore show new phenomena. Clustering into alpha-particles appears in excited states if the binding energy per nucleon is smaller than in alpha-particles. A precipitation of the fermion gas (or liquid) into a Bose gas of alpha-particles will take place in $N=Z$ nuclei at the thresholds for the decomposition into clusters. The properties of the condensed states and their observation in compound nucleus decay are discussed. The considerations are linked to the very high chemical potential for alpha-particles and the properties of the alpha-alpha-potential. A similar shape of a molecular potential is observed in the ^{16}O -alpha-system. These molecular potentials are also the basis for the formation of covalently bound nuclear molecules in neutron-rich Be- and C- and Ne-isotopes. The observation of an intrinsically reflection asymmetric molecular shape in ^{21}Ne with its rotational bands as parity doublets is reported.

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*16H - IPN, Salle des Conseils (Bât. 100)
Café / Thé à partir de 15h45*