Correlations and Clusters in Neutron-rich Matter

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SEM image: [http://remf.dartmoutn.edu/imag

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Nuclear matter away from the ground state



Bulk nuclear matter calculations



Nucleon Density

Near threshold extended wfn – a la haloes











Continuum Effects



Symmetries and Deformation

Nilsson from the Harmonic Oscillator





Ab initio no-core solutions: P. Maris, C. Cockrell, M. Caprio and J.P. Vary



Total density



Neutron - Proton density





What happens when you add neutrons to alpha-particle clusters?



⁴He+n:⁴He+n Bonding π

⁴He+n:⁴He+n Bonding σ





Butadiene

 $-\pi_2$ π π_2 Ω

Molecular behaviour of valence nucleons





The nucleus ²²Ne [AMD]

Kimura



²²Ne [¹⁸O+⁴He] Rogachev et al



¹⁰Be [⁶He+⁴He] Freer et al









R³B@GSI







