

核物理

晕核的标度定律

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摘要

利用重叠函数的渐近归一化常数(ANC)计算了一系列核的价核子处于核外的几率及价核子密度分布的均方根半径 $\langle r^2 \rangle^{1/2}$. 由于实验上抽取的核ANC近似与模型参数无关,因此由核ANC计算的核外几率和均方根半径是考察晕核的可靠且有效的观察量. 依价核子处于核外的几率大于50%为条件, 证实了一些核为晕核, 且给出了比较宽松的晕核出现的条件. 此外, 还用 $\langle r^2 \rangle / R^2 \geq 1.5$ 及 $\langle r^2 \rangle^{1/2} / rc \geq 2.0$ 为判据考察了一系列晕核候选者. 最后, 利用 r^2 算符在有限方势阱中的预期值给出了晕核的标度定律.

We have extracted the probability for a valence particle being out the binding potential, as well as the root mean square radius of the probability distribution from the measured nuclear asymptotic normalization coefficients. According to the criterion of nuclear halo, i.e., the valence particle has larger than 50% probability being out of the nuclear binding potential, a number of halo nuclei have been confirmed. Based on these results, we have obtained a very relaxed condition for nuclear halo formation. In addition, a number of nuclear halo candidates have been analyzed with the criteria of $\langle r^2 \rangle / R^2 \geq 1.5$ and $\langle r^2 \rangle^{1/2} / rc \geq 2.0$. Furthermore, we present the scaling laws for the dimensionless quantity $\langle r^2 \rangle / R^2$ of the nuclear halo in terms of an analytical expressions of the expectation value for the operator r^2 in a finite square well potential.

关键词 [晕核](#) [核外几率](#) [均方根半径](#) [标度定律](#)

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