

Fenomena halo berdasarkan model relativistic mean field (RMF) = Halo phenomenon in relativistic mean field (RMF) model

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Abstrak

[ABSTRAK

Fenomena halo neutron dalam nuklir digambarkan adanya kemunculan 'ekor' dan adanya 'ruang kosong' antara core dan ekor pada distribusi neutron akibat energi ikat yang lemah. Metode analisa halo yang dikembangkan oleh V. Rotival dkk [Phys. Rev. C79, 054308 (2009)] untuk menghitung besaran-besaran halo berdasarkan model Hartree-Fock-Bogoulibov (HFB) pada isotop Cr dan isotop Sn menjadi salah satu alternatif untuk mempelajari fenomena halo. Berbeda dengan Rotival dkk, kami menggunakan model Relativistic Mean Field (RMF) pada penelitian ini. Berbeda dengan hasil perhitungan berdasarkan model HFB, kami fokus mengamati perilaku spektrum single particle energy level $1g_{9/2}$ terhadap kemunculan halo pada isotop Cr. Selain itu, pada penelitian ini kami juga mempelajari dampak dari suku cross coupling meson σ , ω , suku-suku tensor dan suku pertukaran elektromagnetik pada model RMF terhadap kemunculan halo pada isotop Cr dan isotop Sn. Hasil perhitungan prediksi kemunculan halo berdasarkan model RMF lebih besar dibandingkan dengan hasil perhitungan berdasarkan model HFB ($N_{haloRMF} > N_{haloHFB}$):

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ABSTRACT

In neutron halo phenomenon, the neutron density displays an unusually extended 'tail' and 'empty space' between the core and the tail due to weak binding energy. New analysis method of the halo was developed by V. Rotival, et al. [Phys. Rev. C79, 054308 (2009)] in Cr-isotopes and Sn-isotopes, its usually applied with Hartree-Fock-Bogoliubov (HFB) model. Unlike them, we use the model of the Relativistic Mean Field (RMF) in this research. We observed different behavior at the level $1g_{9/2}$ in line with appearance of halo in Cr-isotopes. Moreover, in this research we also studied the effects of cross coupling meson σ , ω , tensor, and electromagnetic exchange in RMF model appearance of halo in Cr-isotopes and Sn-isotopes. The prediction of the existence of halo based on RMF model is greater than the prediction based on HFB model ($N_{haloRMF} > N_{haloHFB}$):, In neutron halo phenomenon, the neutron density displays an unusually extended

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