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Disappearance of Z=120 & 126 magicity and presence of hyper deformations in superheavy nuclei[1] M.M. SHARMA, A.R. FARHAN, Physics Department, Kuwait University, Kuwait — Conventional wisdom has it that Z=120 and especially Z=126 are predicted to be magic numbers for extreme superheavy nuclei. We have undertaken a study of structure of superheavy nuclei in the region of Z=120 to Z=126 within the framework of the deformed relativistic Hartree-Bogoliubov (DRHB) approach. Nuclei in this region entail a large density of states and are thus susceptible to a coupling to the continuum especially those which are close to being proton unbound. The DRHB approach which takes into account the coupling to the continuum is suitable for nuclei in the end of the periodic table. Additionally, the pairing in this approach is included within the Bogoliubov quasi-particle scheme, which takes into account the shell gap at the Fermi surface appropriately. Using the successful Lagrangian model NL-SV1 [1] based upon the vector self-coupling of ω-meson, it is shown that the perceived shell gaps at Z=120 and Z=126 disappear, thus making these proton numbers as non-magic. It is also shown that due to very large Coulomb force acting in these nuclei which are virtually at the end of the periodic table, stability to the nuclei in this region is brought about by extremely large elongated shapes with $\beta_2 \sim$ 0.70-0.80. Consequences on formation of superheavy nuclei in this region will be discussed.

[1]M.M. Sharma, A.R. Farhan and S. Mythili, Phys. Rev. C61 (2000) 054306

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