Stability of $\sqrt{7} \times \sqrt{7}$ phase

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We prepared a solidified first layer of ^{4}He particle on a graphite. The number density of this layer was 12.0nm^{-2} which was a maximum densityof the stable first layer. Then we added ^{3}He particles as the second layer which had the structure of $\sqrt{7} \times \sqrt{7}$ against the first layer. We carried out a path integral Monte Carlo calculation in order to check the stability of this configuration. First we put ^{3}He and ^{4}He particle as the first layer and the second layer, respectively. This inverted configuration became unstable and all the ^{4}He particles were demoted with the progress of Monte Carlo calculation. On the other hand, no promode and no demote was observed for the non-inverted configuration. Therefore we concluded our configuration is stable. Next a melting temperature of the system was calculated utilizing of size dependence of Binder parameter. The convergence of the calculation was poor but the melting temperature was estimated as around 1.4K. A refined calculation is in progress.

Reference
  [1] F. F. Abraham, J. Q. Broughton, P. W. Leung and V. Elser,   Europhys. Lett., 12 (2) 107 (1990)