

**Longitudinal Space Charge Effect for SNS\***,  
W.T. WENG, S.Y. ZHANG, BNL - One of performance requirements of the Spallation Neutron Source (SNS) is to keep the uncontrolled beam loss in the storage ring to less than  $2 \times 10^{-4}$  per pulse, for the maximum beam intensity  $2 \times 10^{14}$  protons per ring. Since the bunch lengthening has impact on both the extraction beam loss and the lowering of the e-p instability threshold, the longitudinal space charge effect requires attentions. Such a space charge effect will be studied both analytically and using computer simulations. The sensitivity of the simulation of the space charge effect will be discussed, and an improvement will be shown. The simulation results will be compared with the analytical predictions. In terms of the longitudinal space charge effect, several schemes of limiting the bunch lengthening will be discussed.

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