

Abstract Submitted  
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**An elastic model of partial budding of retroviruses** RUI ZHANG, TOAN NGUYEN, School of Physics, Georgia Institute of Technology — Retroviruses are characterized by their unique infection strategy of reverse transcription, in which the genetic information flows from RNA back to DNA. The most well known representative is the human immunodeficiency virus (HIV). Unlike budding of traditional enveloped viruses, retrovirus budding happens together with the formation of spherical virus capsids at the cell membrane. Led by this unique budding mechanism, we proposed an elastic model of retrovirus budding in this work. We found that if the lipid molecules of the membrane are supplied fast enough from the cell interior, the budding always proceeds to completion. In the opposite limit, there is an optimal size of partially budded virions. The zenith angle of these partially spherical capsids,  $\alpha$ , is given by  $\alpha \simeq (\tau^2/\kappa\sigma)^{1/4}$ , where  $\kappa$  is the bending modulus of the membrane,  $\sigma$  is the surface tension of the membrane, and  $\tau$  characterizes the strength of capsid protein interaction. If  $\tau$  is large enough such that  $\alpha \sim \pi$ , the budding is complete. Our model explained many features of retrovirus partial budding observed in experiments.

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