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Self-assembly of virus particles: The role of genome GONCA ERDEMCI-TANDOGAN, JEF WAGNER, Department of Physics and Astronomy, University of California, Riverside, RUDOLF PODGORNIK, Department of Physics, University of Ljubljana, ROYA ZANDI, Department of Physics and Astronomy, University of California, Riverside — A virus is an infectious agent that inserts its genetic material into the cell and hijacks the cell's machinery to reproduce. The simplest viruses are made of a protein shell (capsid) that protects its genome (DNA or RNA). Many plant and animal viruses can be assembled spontaneously from a solution of proteins and genetic material in different capsid shapes and sizes. This work focuses on the role of genome in the assembly of spherical RNA viruses. The RNA, a highly flexible polymer, is modeled by mean field approximations. Two RNA models are discussed: (i) A linear polymer model including a pairing affinity between RNA base pairs, and (ii) a branched polymer model. Polymer density and electrostatic potential profiles are obtained, and the relevant free energies are calculated from these profiles. The optimal length of the encapsidated chain is examined as a function of the model parameters. The osmotic pressure of the system is also discussed.

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