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Solid domain rafts in lipid vesicles and scars[1] SLAVA CHUSHAK, Iowa State University, ALEX TRAVESSET, Iowa State University and Ames lab — The free energy of a crystalline domain coexisting with a liquid phase on a spherical vesicle may be approximated by an elastic or stretching energy and a line tension term. The stretching energy generally grows as the area of the domain, while the line tension term grows with its perimeter. We show that if the crystalline domain contains defect arrays consisting of finite length grain boundaries of dislocations (scars) the stretching energy grows linearly with a characteristic length of the crystalline domain. We show that this result is critical to understand the existence of solid domains in lipid-bilayers in the strongly segregated two phase region even for small relative area coverages. The domains evolve from caps to stripes that become thinner as the line tension is decreased. We also discuss the implications of the results for other experimental.

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Alex Travesset
Iowa State University and Ame Lab

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