Bulging Balloons

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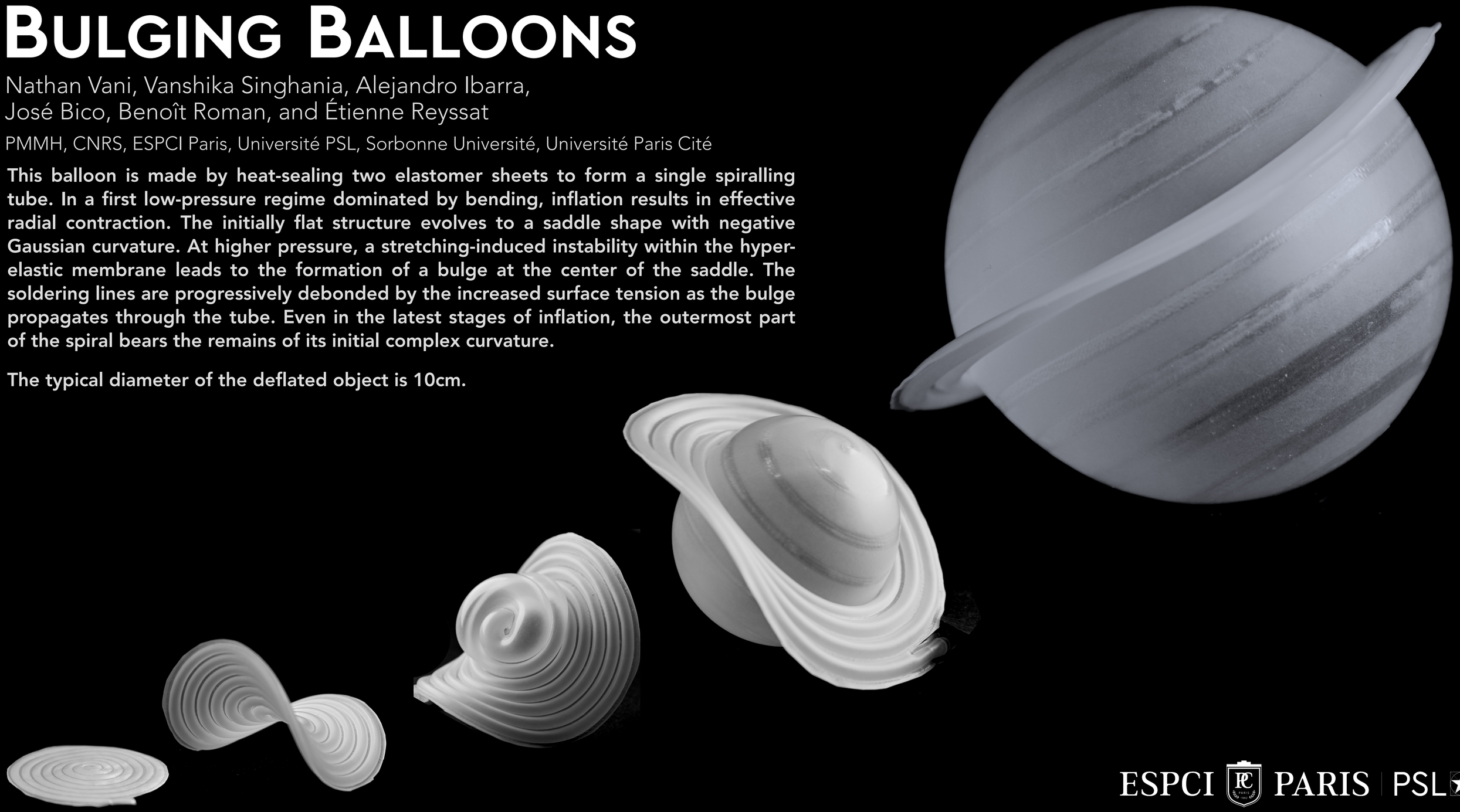
This balloon is made by heat-sealing two elastomer sheets to form a single spiralling tube. In a first low-pressure regime dominated by bending, inflation results in effective radial contraction. The initially flat structure evolves to a saddle shape with negative Gaussian curvature. At higher pressure, a stretching-induced instability within the hyper-elastic membrane leads to the formation of a bulge at the center of the saddle. The soldering lines are progressively debonded by the increased surface tension as the bulge propagates through the tube. Even in the latest stages of inflation, the outermost part of the spiral bears the remains of its initial complex curvature.

The typical diameter of the deflated object is 10cm.



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