8. Balloon (8 points)

Find the mass of the balloon (including the gas inside it). Equipment: balloon (floats in air), digital scales, rope, measuring tape, rope fasteners, dynamometer, paper sheets for folding and rough angle measurements, 100-g weight, thread.

Remark: You may find it useful to know that if a rope is tied around a balloon so that the tension of the rope is T, the excess pressure inside the balloon is Δp, the angle between the tangents of the balloon envelope near the rope is 2α (average over the perimeter; see Figure), and the radius of the circular loop formed by the rope is R, then $\Delta p = \frac{T \tan \alpha}{R^2}$. The universal gas constant $R = 8.31\,\mathrm{J/K \cdot mol}$, the molar mass of air $\mu = 29\,\mathrm{g/mol}$.

