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Title: What can we learn from plants about water at negative pressures?

Abstract: Liquids, like solids, have tensile strength. Indeed, scientists have long known that plants exploit this strength to *pull* water out of the soil and up to their leaves with the pressures in the sap down to -100 atm (tensions up to 100 atm). Nonetheless, the metastable state of liquids under tension – beneath the binodal and above the spinodal – remains largely unexplored scientifically and completely unexploited technologically. In this talk, I will discuss the thermodynamics of transpiration in plants and present a bio-mimetic route to large tensions in the laboratory. Based on experiments with "synthetic plants", I will illustrate the surprising processes that are enabled by working in this regime. I will then discuss the origin of the limit of stability of liquid water in plants (natural and synthetic) and more generally. Finally, I will conclude with the presentation of opportunities to exploit this regime to gain insights into the fundamental character of the liquid water (e.g., the molecular origin of water's anamolies) and to address important technological challenges in the management of energy and natural resources.