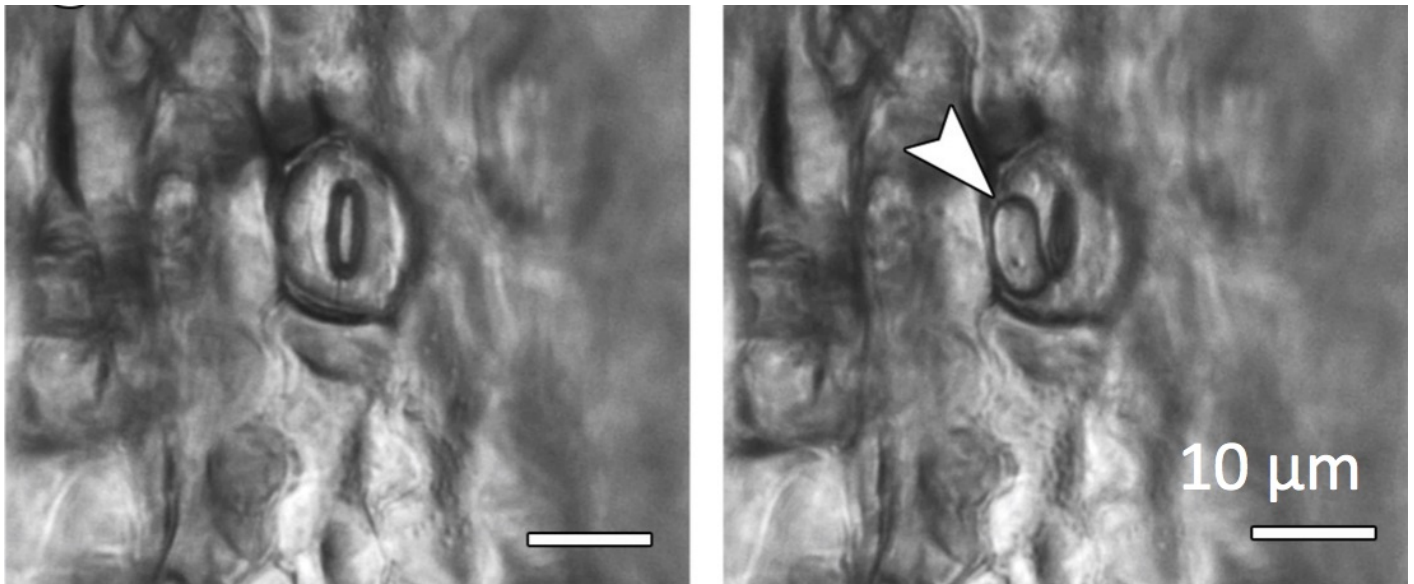


A new tool to measure pressure at a distance in plant cells: laser bubble nucleation

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Plant cells can sustain very elevated positive or negative pressures. It is difficult to measure pressure in a liquid at a distance, contrary to the velocity field where following particles gives a measure of the velocity. The traditional method to measure the pressure in plant cells is the pressure probe method. It consist in piercing the cell with a fine needle, to connect the cell interior to a sensor via a liquid that convey the pressure up to a sensor. Unfortunately this method is very delicate, since leaks or cell rupture occur frequently. Here we show a new method, which consist in nucleating a bubble by focusing a laser pulse inside the cell. The size and its evolution then give clues of the liquid pressure. An application is presented to measure the pressure in guard cells, cells responsible for closing and opening the stomata of leaves that regulate evaporation.



Nucleation of a laser bubble in the guard cells protecting the entrance of the stomatal chamber in a leaf.