The following article is inspired from the book “UNCORKED – The Science of Champagne” written by Gerard Ligier-Belair, Professor of Physical Sciences at the University of Reims (Champagne).

Through lively prose and world unique state-of-the-art high speed photos, this captivating book unlocks the door of the mystery of what Champagne effervescence is really about. The book also provides a colorful history of Champagne.

I have chosen to give you a quick summary of the chapter “The birth of a bubble”. And in case you are a real bubbly addict but you would like to drink a bit more “cleverly”, we have a few copies available of this excellent book (150 pages – R260).

THE BIRTH OF THE CHAMPAGNE BUBBLE...

Pop open a bottle of Champagne, pour yourself a flute, and observe what happens in the small space inside the glass. Bubbles form on several spots of the glass wall, detach and then rise toward the surface in elegant trails, like so many tiny hot-air balloons. Listen carefully also. When they burst at the surface, the bubbles make a crackling sound and produce a cloud of tiny droplets that pleasantly tickle the taster’s nostrils...

If you were to leave your glass of Champagne alone and resist drinking from it until it stopped sparkling, about 2,000,000 bubbles would have escaped from your flute!!! But how do these bubbles form (or “nucleate”) in the first place?
During the second fermentation in the bottle, the sugar added will transform in about 1.3% alcohol and also about 12 grams of a gas called carbon dioxide. That carbon dioxide is not yet in the form of bubbles but rather in the form of molecules dissolved in the wine. Only a small part of it will become gaseous inside the little air space left in the bottle, until equilibrium is established.

When poured in the glass, most of the carbon dioxide is thus still dissolved in the Champagne. Bubbles don’t just pop from out of nothing. To form into bubbles, those molecules must cluster together and the only place this could happen is in small air cavities ("bubble nucleation sites") found inside the glass.

The largest part of those bubble nucleation sites are located on impurities that are stuck on the glass wall. Those are mostly elongated and hollow cellulose fibers cast off from paper or cloth coming from the surrounding air or that remained on the glass when it was wiped dry. Because of their geometric properties, such hollow particles cannot be wetted down completely by the Champagne and consequently trap tiny air pockets even when the glass is filled.

This amazing sequence of photographs shows the birth process. Size of the fiber shown is less than 0.2mm and duration of the sequence about 4/100th of a second….

Champagne poured into a perfectly “clean and sterile” container would not bubble at all! Such an experiment was conducted in Moet & Chandon’s laboratory and after pouring the Champagne simply looked like a still wine!

Cheers !!!!