Review of: "Relation Between Quantum Jump and Wave Function Collapse"

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Potential competing interests: No potential competing interests to declare.

I read with interest your article and the accompanying Ref. 1.

I realised that you have your own definition of the notion "wave function collapse" (WFC):
"wave function (WF) is a theoretical notion associated with a probability distribution (PD) of quantum states. Now we define a WFC to be a phenomenon associated with a single measurement. For single-particle quantum mechanics, the PD is obtained from repeated measurements. A single event does not tell anything about the PD, and therefore WF does not collapse."

For this, your definition, your sentences are conclusive.

As I understand it, the term WFC is used for the situation when very weak light / a single photon hits a slit and is registered at a pixel of the CCD camera. The question here is whether we see the photon as a particle or whether the light should be seen as a wave. This interesting question remains unaddressed in your definition of the WFC. You use the term "microscopic quantum jump" (MIJ) to describe this event.

You write explicitly in B: "As we have already mentioned, a MIJ is a process of selecting a set of system eigenvalues SEVs of an observable, but not a collapse of wave function."

Of course, it is interesting to discuss these questions. However, I see the problem that the introduction of another term "microscopic quantum jump" (MIJ) does not solve the actual physical question of why the diffraction of light can be treated as a wave and the light is detected as a particle, which is usually referred to as "wave function collapse". A further step in understanding the mechanisms could lie in the fact that there is a phenomenon that lies between waves and

particles, the phenomenon of topological solitons. An electromagnetic wave could be characterized by a topological quantum number that can only change in integer steps. Incidentally, there is even a suggestion as to what such a formulation of electrodynamics might look like.