Referee Report on Manuscript "On the Problem of Reduction of the States Vector"

The author considers the problem of the wave function reduction in quantum theory. He/she notes that this is a fundamental problem of quantum theory and briefly describes different approaches for solving this problem. Here any new ideas and approaches are welcome and the author proposes his/her new approach.

The author considers two experiments where particles fall on the screen. In contrast to previous approaches, the author treats the screen as a quantum object described by its own wave function. Naively one might think that the wave function of the screen has the same order of magnitude in all regions of the screen because a naive picture is that each atom can make only small oscillations around its position of equilibrium. However, in the first experiment the author proposes a model where the wave function has a sharp maximum in a region having the width Δx while in other regions it is much smaller. The screen is a macroscopic object consisting of many atoms and molecules. So the author's proposal implies that at each moment of time all those atoms and molecules are distributed not uniformly in $[0, L]$ but are mainly concentrated somewhere in the interval $(x_0, x_0 + \Delta x)$. Is this what the author means? If this is the case then a problem arises why we naively think that the matter in the screen is distributed uniformly in $[0, L]$. Maybe the wave packet with the width Δx is moving so fast between $x = 0$ and $x = L$ that we cannot notice this motion and our naive expectation represents only a mean picture?

Similar remarks apply in the second experiment but, in addition, the following problem arises. The wave functions of the screen in the first and second experiments are different. The difference between the experiments is that in the second experiment there is a wall with slots before the screen. My understanding is that for some reasons the author assumes that the screen knows where the wall and the slots in the wall are. For me it is not clear why the position of the wall and slots should affect the wave function of the screen.

I believe that a typical reader will have approximately the same questions. The author proposes a fully new approach for describing the above experiments. That's why the author should expect that readers familiar with standard approaches will have questions. The author should clearly explain why his/her approach is well founded.

I would also like to pay attention to the following minor issues:

1) Although the text is well understood, it is desirable to improve the English language in the manuscript.

2) In the English-language literature the quantity p is called momentum while impulse is the change of momentum $F\Delta t$ (in the Russian-language literature p is called impulse).

3) Line 104 probably should read: "...$\Phi(x, 0) = 0$ at $x < 0$ and $x > L/N$...".

4) On line 108 m probably should be the mass of the screen, not of the registered particle because before the author considers the wave function of the screen.