Review of: "Circuits, Currents, Kirchhoff, and Maxwell"

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The paper is focused on the Kirchhoff's current law. The Author is trying to conceive the reader that the so-called total current should be considered in all cases, as compatible with one of Maxwell's equation, namely Maxwell-Ampére law. The trial is somewhat strange, because most (if not all) textbooks known to me present such a point of view. But I can understand the paper also as a presentation of various aspects of Kirchhoff's current law, which seems quite interesting. Yet I cannot agree with everything in the paper, at least if some additional explanations are not made. Before I present my remarks, I would like to write that I worked with version 2 of the paper, and when loading my review I was informed an improved version is available. I have looked into the new version quickly and it seems that my remarks are still update.

1. The Author focused on the Kirchhoff's current law as crucial for current description in circuits. But there is also other (equally) important law, the Kirchhoff's voltage law, which is not even mentioned. These two laws together (with laws for particular elements) govern the current flow in a circuit.
2. All used symbols should be explained when used first time. For example, the "displacement current" is introduced just as

$$\varepsilon_0 \partial \mathbf{E} / \partial t$$

without writing a word what **E** and other symbols are. Some explanations appear later in the text, but I think they should be given earlier. This concerns also to other symbols, including those on page 8 and related with equation (8).

3. The Author uses "displacement current" for a quantity which is "displacement current density" rather.
4. Abstract and page 7: "In a series circuit, the coupling in Kirchhoff's law makes the total current exactly equal everywhere at any time" – I cannot agree with this. The signals propagate with finite velocity. A change in voltage between the terminals of voltage source needs time to propagate along wires to the load. This is visible, for example, in the so-called transmission line. The current at the beginning in the line can be quite different than that at the end, although the circuit is a series connection of a wire, load and the second wire. The reason of the misunderstanding lies probably in the fact that the Author does not say anything on other Maxwell's equations (like Faraday electromagnetic induction law). Maybe the considerations could be rescued by assumption that we consider only circuits of dimensions much smaller than the wavelength, but this would contradict the generality of the considerations.
5. Page 5: "the mathematical definition of conservation" – conservation of what (total current?). Something is not clear to me here.

6. Page 6: “Classical electrostatics” – in electrostatics we deal with static charges; therefore, there is no change in time, and the derivative with respect to time becomes zero then. Therefore, it is somewhat strange to discuss the influence of the displacement current density in electrostatics – if there is a change in time it is not electrostatics.
7. Page 7: The conclusion of J total being constant in a series circuit is not true. The fact that divergence of J total does not imply that “the total currents J total in a series circuit are equal everywhere.“ It seems that two different quantities (“current” and “current density”) are mixed here. See also remark 4.
8. Page 10: The Author states that Maxwell’s equations are true also in the smallest quantum scale. As far as I know, the Maxwell’s equations are a limit of quantum electrodynamics for larger scales. Many quantum phenomena cannot be explained by just Maxwell’s equations, starting from lack of radiation when electrons orbit around atomic nuclei.
9. Page 12 above equation (9): the quantity (the derivative) is not charge density.