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## How far can a pragmatist go into quantum theory? A critical view of our current understanding of quantum phenomena.

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Quantum mechanics has proven to be the most successful theory ever devised. This theory not only has addressed the most fundamental physical problems, but its applications constitute an important part of our everyday life (actually, more sophisticated applications are still to come). There is however a “mystery” involving this theory since its inception. The fact that we cannot understand quantum phenomena under the same logic as we do with classical phenomena brings in a puzzling situation which has left open a tough debate on its interpretation since the 1930s. Probably this debate will never be really closed (or at least until we will be able to devise a new, wider theory) and, in such a case, it might be pointless to make or even talk about quantum philosophical issues or to further develop the area of the quantum foundations. This leads to a kind of hopeless situation. It directly goes to a materialization of Plato’s myth of the cave: we are enforced to perceive the shadows cast on the wall of the cave (our reality) by the real world (the Reality), without the possibility to ever reaching a true understanding of the physical world.

Even in such a harsh scenario, there is still room enough to further explore the quantum world from a pragmatist’s point of view. We know a lot about the vacuum properties without knowing what vacuum really is; we are developing amazing technologies based on quantum entanglement without knowing how entangled correlations really happen or operate at a fundamental level. At this point, one needs to turn back the eyes and reflect about how the quantum theory has developed since its inception at a conceptual level, what can be done nowadays, or which new, nonorthodox paths are and can be followed. One of them is the quantum hydrodynamical approach to the quantum theory, shyly developed during the 1950s and that nowadays is trying to open new pathways of understanding. This communication will deal with the evolution of this approach since its inception, its meaning and interest, the kind of quantum physics that can be inferred from it, and the contextualization of quantum mechanics according to it.

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