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**Symposium : Quantum Cultures: Historical Perspectives on the Practices of
Quantum Physicists**

**25th International Congress of History of Science, Technology and Medicine – Rio
de Janeiro**

**Beyond ideology: Mathematical and epistemological foundations of Vladimir
Fock's approach to Quantum Theory – Considerations on a marginal quantum
culture (1930-1970)**

Résumé court :

The present communication aims to put in evidence some unknown characteristics of the interpretation of quantum mechanics by the Soviet physicist Vladimir Fock. Indeed, due to his endorsement of dialectical materialism, the official Soviet ideology, Fock's role in the diffusion of the quantum theory is often described only for its political and dogmatic dimension. However, from a closer analysis of different papers on Quantum mechanics we can observe that the position held by Fock had a real and profound scientific content, which raised real questions for the understanding of the theory. Thus, Fock developed a singular quantum "culture" that he long tried to promote among the members of the so-called Copenhagen school, representatives of an orthodox interpretation of the theory, but also among Marxists circles usually turned toward statistical interpretations of Quantum Mechanics.

Résumé long :

Nowadays Fock is a familiar name to many physicists, especially in Quantum Theory. Contributions like the Hartree-Fock method or the Fock space are recognized as fundamental elements for the discipline. Usually regarded as a member of the Copenhagen school, Fock is also known for his endorsement of dialectical materialism, the official Soviet ideology. Thus, he developed an alternative interpretation of Quantum Mechanics which resulted in a dispute with Niels Bohr. Although the dispute

is often mentioned by historians of science, the real content of Fock's interpretation of Quantum Mechanics remains relatively unknown. Indeed, the meeting between the two physicists in Copenhagen in 1957 is primarily described for its ideological and political dimensions. The dispute is often portrayed as an example of the harmful effects the Soviet regime had on scientists. Fock's rhetoric, which takes up some features of the Soviet discourse, can be invoked to explain this situation.

But from a closer analysis of different papers on Quantum Mechanics, we can observe that the position held by Fock had a real and profound scientific content. It raised real questions for the whole understanding of the theory. Beyond what can be interpreted as pure ideological features imposed by dialectical materialism, we observe a physicist engaged in some of the most widely-spread questions concerning physics: the role of mathematics, reductionism, and realism. Considering the whole picture, an account of Fock's global approach to physics can be established. An approach that he applied not only to Quantum Mechanics but also to General Relativity. In the case of quantum theory, we can see the emergence of a singular quantum "culture" that he long tried to promote. But Fock was in a peculiar position, distinguishing himself not only from the Copenhagen orthodoxy, but also from statistical interpretations of Quantum Mechanics being traditionally promoted in Marxists circles. Fock criticized both sides, and was criticized by them in return. He thus remained very isolated.

The present contribution aims at giving a better account of Fock's understanding of Quantum Mechanics and the role played by dialectical materialism. It also intends to be a case study of a marginal quantum culture stuck between two very influential fronts, and the object of ideological and political influences.