

**A VIEW ON THE PRESENT SITUATION IN  
PHYSICS**

**tied with**

***"PRINCIPLES OF  
A SECOND QUANTUM MECHANICS QM2  
ROOTED IN FACTUALITY  
AND CONSTRUCTED BOTTOM-UP"***

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***Debate on interpretations of the Quantum Mechanics  
4,5 October 2019***

**THE MANUSCRIPT OF THE WORK COMMENTED BELOW  
IS AVAILABLE IN THIS CONFERENCE.**

**THE WORK IS LONG AND OF A NATURE THAT WITHSTANDS ANY  
HURRIED EXPOSITION OF ITS CONTENTS.**

**SO WHAT FOLLOWS IS ONLY A VERY RAPID PRESENTATION  
OF SOME HISTORICAL SPECIFICATIONS  
ON THE PROCESS OF EMERGENCE OF THIS WORK.**

**THESE, I HOPE, MIGHT PERMIT NOT TO CONSIDER THE WORK  
*OUT OF ITS PLACE IN THE PRESENT DEBATE,*  
NOTWITHSTANDING THAT IT PROPOSES  
**A NEW QUANTUM MECHANICS,****

***NOT***  
***AN "INTERPRETATION" OF THE ORTHODOX QM.***

**OTHER INFORMATIONS ON MY WORK  
CAN BE FOUND ON MY WEB-SITES:**

<http://www.mugur-schachter.net/>

[http://en.wikipedia.org/wiki/Mioara\\_Mugur-Schächter](http://en.wikipedia.org/wiki/Mioara_Mugur-Schächter)

# **BRIEF CHRONOLOGY LEADING TO QM2 AND SOME COMMENTS**

## **A FIRST CRITICAL-ANALYTIC PERIOD: 1960-1979**

**1. Invalidation of *von Neumann's theorem on impossibility of hidden variables compatible with the formalism of Quantum Mechanics*, in my Ph.D. Thesis titled "Etude du caractère complet de la mécanique quantique", Gauthier Villars, Paris 1964, book *prefaced by Louis de Broglie*.**

**2. Study of *Wigner's Theorem on Joint Probabilities*, *Foundations of Phys.*, vol 9, 1977 (in fact – again – an invalidation), proposed *by him* for publication.**

**3. *Réflexion sur le problème de localité*, in "Einstein 1979-1955, Colloque du centenaire, Collège de France, 6-9 juin 1979, Editions du CNRS, 1980.**

**This was not an "invalidation" in the strict sense, but a very organized exposition of a refusal to assign to Bell's work the structure of a "theorem".**

**A SECOND CONSTRUCTIVE PERIOD  
1979 - 2019**

**THE START OF THIS PERIOD:  
THE COLLOQUIUM 1979 ON BELL'S THEOREM**



***FALSE ABSOLUTES,  
NECESSITY TO RELATIVIZE,  
MINIMAL REALISM,  
FIRST SKETCHES OF A  
"METHOD OF RELATIVIZED CONCEPTUALIZATION",  
(MRC)***

**1994-2008**

**CeSEF**

**(Centre pour la Synthèse d'une  
Épistémologie Formalisée)**

**2002 :**

***MRC (Foundations of Science, then Kluwer)***

**2006:**

**"SUR LE TISSAGE DES CONNAISSANCES"  
("On the Webbing of Knowledge")  
(Lavoisier)**

***Throughout the period 1960-2006  
I was researching a "re-interpretation"  
of the orthodox QM.  
IN THIS SENSE I DO BELONG HERE.***

**IT WAS FOR *THIS* AIM THAT I HAD WANTED TO DEVELOP  
A *GENERAL* METHOD  
FOR THE CONSTRUCTION OF "*SCIENTIFIC*" KNOWLEDGE  
(i.e. A METHODOLOGICAL SYSTEM OF  
*CONSENSUAL, COMMUNICABLE, PREDICTIVE AND  
VERIFIABLE KNOWLEDGES*).**

***MRC IS FORMULATED IN QUALITATIVE BUT  
FORMALIZED  
TERMS,  
i.e. AS  
A (VERY ECONOMIC) SEQUENCE OF  
POSTULATES, DEFINITIONS,  
AND PROOFS (IN THE SENSE OF CURRENT LOGIC)***

**At that time – 2006 – when MRC was already wholly available in its essence, my attention turned decidedly toward the specific question of the development of a second QM fully *acceptable in the sense of MCR.***

**However, for some time I *still* kept researching a better "*interpretation*" of QM<sub>HD</sub>.**

**WITH MRC AVAILABLE, THE MAIN NEW PROBLEM WAS:**

**HOW COULD ONE KEEP  
THE PROCESS OF *IDENTIFICATION AND SPECIFICATION*  
OF THE MODIFICATIONS TO BE MADE  
INSIDE CURRENT QM,  
UNDER SOME SORT OF  
*STRICT CONTROL OF*  
*THE MEANING AND COHERENCE ?***

**DURING THE PERIOD 2006-2009  
THE STUDY OF *THIS* PROBLEM - AND *INSIDE MRC* -  
LED TO THE FIRST FORM OF THE**

**"INFRA-(QUANTUM-MECHANICS)"  
*IQM.***

**THIS IS**

**A RELATIVIZED STRUCTURE  
FOR REFERENCE-AND-IMBEDMENT-IN-MCR  
OF  
*ANY ACCEPTABLE "THEORY" OF THE MICROSTATES.***

**BUT WHEN IQM IS CONSTRUCTED INSIDE MRC VIA IQM,  
IT BECOMES OBVIOUS THAT  
IN ORDER TO BE ABLE TO DEFINE  
ACTS OF "MEASUREMENT"  
OF THIS OR THAT DEFINITE MECHANICAL QUANTITY  
ASSIGNED TO A STUDIED MICRO-STATE  
- "POSITION", "MOMENTUM", "KINETIC ENERGY" -  
ONE NEEDS UNAVOIDABLY  
SOME GENERAL MODEL OF A "MICRO-STATE"**

**FOR:**

***HOW***

**COULD ONE IMAGINE A WAY TO "MEASURE",  
FOR A "MICRO-STATE" THAT IS  
*UNKNOWN AND NON-PERCEIVABLE,*  
A GIVEN SORT OF MECHANICAL QUANTITY  
*WITHOUT HAVING ANY MODEL IN ONE'S MIND?***

**WHEN MOREOVER THE OBSERVABLE RESULT  
OF ANY ONE ACT OF MEASUREMENT CONSISTS  
- EXCLUSIVELY -  
OF SOME GROUP OF SIGNS  
*DEVOID OF OWN SIGNIFICANCE*  
(POINTS, TRACES, SOUNDS-AT-A-GIVEN-MOMENT)  
REGISTERED ON (OR BY) REGISTERING DEVICES ?**



# HOW

**CAN ONE EVEN ONLY ASSERT THAT  
*THAT* WHAT IS CALLED A  
"MICROSTATE"  
*DOES ADMIT QUALIFICATIONS  
IN TERMS OF THE CONSIDERED  
MECHANICAL QUANTITY ?***

**THIS FIRST QUESTION  
FOCUSES ATTENTION UPON TWO OTHER DISTINCT  
QUESTIONS:**

**WHERE HAS DE BROGLIE'S SEMINAL MODEL  
DISAPPEARED INSIDE DIRAC'S  $QM_{HD}$  ?**

**HOW DOES ONE  
CODE  
IN TERMS OF A GIVEN  
VALUE OF THE MEASURED QUANTITY,  
THE GROUP OF OBSERVABLE SIGNS  
OBTAINED VIA ONE ACT OF MEASUREMENT ?  
HOW,  
IN GENERAL TERMS?**

**THESE QUESTIONS FINALLY MADE IT CLEAR TO ME  
THAT A FULLY ACCEPTABLE REPRESENTATION OF THE  
MICROSTATES**

***CANNOT BE REALIZED BY JUST  
FORMAL-CONCEPTUAL MODIFICATIONS OF  $QM_{HD}$***

**A "THEORY" OF PHYSICAL ENTITIES  
REQUIRES *IRREPRESSIBLY*  
ALSO DEFINITIONS OF  
*PHYSICALLY-OPERATIONAL CONCEPTS***

**IT FINALLY APPEARED TO ME THAT  
DURING MORE THAN 100 YEARS  
A QUITE NOTABLE NUMBER OF OUTSTANDING PHYSICISTS  
HAVE KEPT TRYING TO REPRESENT MICRO-STATES  
EXCLUSIVELY VIA  
MERE EXTRAPOLATIONS FROM THE CLASSICAL PHYSICS  
THAT DEALS MOSTLY WITH DIRECTLY OBSERVABLE  
PHYSICAL ENTITIES.**

**THIS IS WHAT LED  
TO A "THEORY OF QUANTUM MEASUREMENTS"  
THAT IS  
DEVOID OF ANY PHYSICALLY-OPERATIONAL DEFINITION  
OF THE GENERAL WAY IN WHICH  
AN ONLY CONCEIVED OBJECT-ENTITY-TO-BE-STUDIED,  
LIKE A "MICROSTATE" IS,  
CAN BE, AS IT IS NECESSARY,  
GENERATED IN THIS ROLE OF  
OBJECT-ENTITY-TO-BE-STUDIED,  
IN WHICH IN GENERAL  
IT DOES NOT PRE-EXIST**

**AND SO**  
**"ONE ACT OF MEASUREMENT"**  
**ON A STRICTLY NON-PERCEIVABLE**  
**"MICROSTATE" OF SOME GIVEN SORT,**  
**REMAINED ALSO DEVOID**  
***OF ANY PHYSICAL-OPERATIONAL DEFINITION.***

**THIS AMOUNTS TO A STRANGE FACT:**  
**THE NOWADAYS QUANTUM MECHANICS**  
**IS *DEVOID***  
**OF ANY THEORY OF MEASUREMENT**  
***SPECIFIED***  
***IN A COMMUNICABLE AND CONSENSUAL***  
***CONCEPTUAL-PHYSICAL SENSE.***

**WHILE IT DEALS WITH STRICTLY**  
**UNOBSERVABLE,**  
**ONLY CONCEIVED PHYSICAL ENTITIES.**

**WHEN AROUND 1900  
AN "ULTRAVIOLET CATASTROPH" APPEARED,  
*ONLY POSTULATES WERE INTRODUCED*  
(BOHR, PLANK, EINSTEIN),  
*TOGETHER WITH BOHR'S INTERDICTION  
OF ANY MODEL.***

**THEN (*LATER* (AROUND 1930)), ARRIVED DE BROGLIE  
AND HIS MODEL.**

**AND THEN DIRAC CONSTRUCTED  $QM_{HD}$   
WITH DE BROGLIE'S MODEL HIDDEN SOMEWHERE  
INSIDE ITS FORMALISM;  
WHERE VON NEUMANN STUFFED ALSO  
HIS "THEORY" OF QUANTUM MEASUREMENTS,  
THAT IS JUST  
*A MATHEMATICALLY EXPRESSED  
CONCEPTUAL MIXTURE  
OF DIFFERENT LEVELS OF REPRESENTATION.***

***THIS REPRESENTATION  
HAS NOW TO BE REPLACED.***

***NOT INTERPRETED,  
BUT DECIDEDLY REPLACED***

***AND REPLACED  
CONSTRUCTIVELY, AND BOTTOM-UP,  
AND ENDOWED WITH  
A GENUINE THEORY OF QUANTUM MEASUREMENTS  
DEFINED ALSO  
IN CONCEPTUAL AND PHYSICALLY-OPERATIONAL  
TERMS  
TIED EXPLICITLY WITH A SPECIFIED MODEL.***

**IN SHORT,  
I UNDERSTOOD THAT  
A **NEW** QUANTUM MECHANICS IS  
IRREPRESSIBLY NECESSARY.**

**THE PREVIOUS THEORIES HAVE BEEN JUST  
PROVISIONAL DRAFTS,  
AS PERMITTED BY THE SUCCESSIVE  
HISTORICAL STATES OF THE PROBLEM  
THAT **OBLIGED**  
TO START FROM THE CLASSICAL MECHANICS  
AND TO BEGIN BY A TOP-DOWN PROGRESSION.**

**THESE DRAFTS HAVE PREPARED THE  
POSSIBILITY  
– AND THE FINALLY PERCEIVED NECESSITY –  
TO RE-CONSTRUCT BOTTOM-UP,  
**IN ORDER TO CAPTURE ALL THE SPECIFICITIES  
OF THE SUCCESSIVELY ENCOUNTERED  
PHYSICAL-CONCEPTUAL CIRCUMSTANCES,  
IN THEIR OWN LOGICO-ORGANIC ORDER****

**AND THIS IS A MATTER OF METHOD**



**In 2013 I obtained a better representation of IQM where it is possible to become aware that**

***In Bell's "theorem"  
the verbally formulated conclusion  
does not follow from  
the mathematically established results.***

***SO INDEED IT IS NOT A THEOREM***

***And – remarkably – this appears fully inside  
IQM,  
the mathematical formalism from QM2  
is not necessary for showing this.***

**In this year 2019  
I publicly submit to the physicists, for estimation,  
the final version of the  
*"Principles of a Second Quantum Mechanics QM2"*.**

**This *Second Quantum Mechanics QM2*  
is developed inside the  
*Structure for Reference and Imbedment*  
that I called *"Infra – (Quantum Mechanics)"*  
and I denoted *IQM*,**

**which in its turn is developed inside the  
*Method of Relativized Conceptualization, MRC*.**

## BY-PRODUCTS

I just mention that the construction of *QM2* has generated by-products that, I think, are worth being noted:

**1. A new sort of concept of probability, the "factual probability-trees of an operation of generation of the studied object-entity".**

The probability-laws that are involved in this concept are expressed in Hilbert-Dirac terms, *in direct consequences of Gleason's theorem, and they can be associated with Kolmogorov probability-spaces.*

**2. THE MENTIONED NEW CONCEPT OF PROBABILITY LEADS IMMEDIATELY TO THE MATHEMATIZATION OF THE WHOLE *MRC*.**

**SO WE COME IN POSSESSION OF A MATHEMATICAL EPISTEMOLOGY OF "SCIENTIFIC" THINKING.**

**3. Inside MRC one can discern paths that *connect to one another* any two mutually distinct scientific theories.**

**This entails the possibility of multiple, arbitrarily complex**

***METHODOLOGICAL UNIFICATIONS OF "THE SCIENCES",***

***AND EVEN OF "THE SCIENCES" AND "THE TECHNIQUES" AS HENRI BOULOUET SHOWS***

**4. Therefrom there emerges *also* the possibility to realize – in a methodological way – an unlimited variety of other goals that, from a *descriptive* viewpoint are "individual" (i.e. can be expressed by "one" description), as well as MRC-*structures* of such individual goals, that are subjected to a collective meta-goal.**

**SO WE CAN NOW DREAM**

***TO CONSENSUALLY CONTROL OUR EVOLUTION.***

***WHICH GOES FAR BEYOND ALL THE SCIENCES AND THE TECHNIQUES***

**Permit me to also add what follows.**

**For me,  
the construction of QM2 has been  
densely interrupted by  
*SURPRISES.***

**And each one of these took a long time for being  
domesticated in my mind,  
"understood", explained, *and* finally made use of.**

**That is why I dare to take the liberty to propose this:**

**First read the *whole* work, up to its end.  
And only *after the end*  
list the residual questions.**

**These I would be genuinely happy to learn  
and to try to answer.  
(I suppose that Doctor Ferensby can find a way for  
this to be done).**

**I thank you for your attention.**