



UNIVERSITÀ DELLA CALABRIA

DIPARTIMENTO DI
MATEMATICA
E INFORMATICA

Avviso di Seminario

Martedì 09 dicembre 2014 – ore 16:30

Aula MT10 – cubo 30B primo piano

Claudio Garola

Institute of Mathematics and Physics of the University of Salento

terrà un seminario dal titolo:

Outline of a generalization and reinterpretation of quantum mechanics recovering objectivity

Il Direttore del Dipartimento
prof. Nicola LEONE

Abstract:

Most scholars concerned with the foundations of quantum mechanics (QM) think that *contextuality* and *nonlocality* (hence *nonobjectivity* of physical properties) are unavoidable features of QM which follow from the mathematical apparatus of QM, as proven by known “no-go” theorems. Moreover these features are usually considered as basic in quantum information processing. Nevertheless they raise deep and still unsolved problems, as the *objectification problem* in the quantum theory of measurement. The *extended semantic realism (ESR) model* [1, 2, 3, 6, 9, 10] offers a possible way out from these difficulties by embedding the mathematical formalism of QM into a broader mathematical



formalism and reinterpreting quantum probabilities as *conditional on detection* rather than absolute. The embedding allows to recover the formal apparatus of QM within the ESR model, and the reinterpretation of QM allows to construct a noncontextual hidden variables theory which justifies the assumptions introduced in the ESR model and proves its objectivity, circumventing the “no-go” theorems. According to this model both linear and nonlinear time evolution may occur, depending on the physical environment, as in QM. When applied to special cases the ESR model modifies Bell’s inequalities avoiding conflicts with QM [2, 3, 4, 9], supplies different mathematical representations of proper and improper mixtures [3, 5, 6, 9, 10], provides a general framework in which the local interpretations of the GHZ experiment obtained by other authors are recovered and explained [7], and supports interpretations of quantum logic which avoid the introduction of the problematic notion of quantum truth [8, 11].

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