Predictive Power of Mathematical Modelling in Physics

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As it is known, certain journals such as e.g. Physical Review A (other journals of the APS are expected to follow soon) intend to impose serious limitations on publishing the scientific articles in which the mathematical modelling and in particular the theory predictions and/or analysis is NOT accompanied by the critical assessment of the statistical value of such predictions (sometime referred to as 'Predictive Power', the methodology developing quickly) cf. Phys. Rev. A 83, 040001 (2011) for the example of recommendations in this respect.

The lectures address PhD students of all possible levels and speciality profiles who need to understand, provide or asses the quality of mathematical modelling of the experimental results.

In the lectures we introduce and discuss such issues as the sources of uncertainties of the theoretical modelling, the question of the so-called inverse problem, ill-posed inverse problem, the consequences of ill-posedeness, the meaningless Chi^2 fitting, the regularisation methods, the Monte-Carlo methods of studying the predictive power of theories and/or modelling, their dependence on the so-called sampling the latter underlying the solutions of the inverse problems, etc..

Time: on Tuesday 19 and 26 February and 5, 12, 19 and 26 March 2013 from 16h00 to 18h00.

Place: The lectures will take place in the Amphi Grunwald, 23 rue du Loess, 67037 Strasbourg.