

**Workshop in Stochastic Analysis and  
Applications**

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**Nonlinear SPDEs and irregular  
nonlinearities**

**Abstract**

In nonlinear SPDEs one encounters irregular "functions" or distributions that need to be manipulated nonlinearly. In the early distribution theory L. Schwartz concluded in the impossibility of such manipulations *L. Schwartz, Impossibility of the multiplication of distributions, Comptes Rendus 239, 1954, 847-848*. Later he presented the note *JF Colombeau, A general multiplication of distributions, Comptes Rendus 236, 1983, 357-360* from some originality not perceived in 1954. This context is suited for explicit calculations and theoretical proofs. Usually nonlinear PDEs without distributional solutions have solutions in this context. In some cases in which there are different possible solutions it has been possible to select a physically correct one giving new formulas in agreement with experimental observation, see the book *JF. Colombeau, Multiplication of distributions, Springer Lecture Notes in Math 1532, 1992*. In the talk we will introduce the above very simply without any prerequisite, hoping this method could be reproduced not only for existence (it works) but also for uniqueness from a choice motivated by physics.