



École doctorale de Physique en Île de France

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COURS

Practical Data Analysis

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Performing research in experimental physics involves acquiring, processing, analyzing and interpreting data with much higher proficiency than typically required during undergraduate studies. In particular, a rigorous treatment of measurement uncertainties is crucial for a proper validation of the hypotheses motivating the experiments. We aim to bridge this gap both at the theoretical and the practical level, so each session will consist of a lecture to introduce the concepts and a computer-based practical part where they will be applied. We will discuss the following topics:

- Probabilities: random variables, distribution laws, moments
- Error and uncertainty: definitions, error propagation and composition
- Linear fitting: weighting, parameter uncertainty
- Nonlinear fitting: algorithms, constraints, difficulties
- Statistical learning: Singular Value Decomposition, Principal Component Analysis etc.
- Introduction to Bayesian theory

Due to space constraints, attendance will be limited to **15 participants, who should bring along their laptop computers with the data treatment software they expect to use during their thesis**. Depending on the audience, the course will be given in either **English or French**.

Ten three-hour sessions (1.5 hour lecture and 1.5 hour practicals)

From **14:00 to 17:00** every Tuesday from **November 7th 2017** to **January 23rd 2018**, except for Dec. 26th and Jan. 2nd.

In room 208a (2nd floor, South wing) at the Laboratoire de Physique des Solides, bâtiment 510, Université Paris-Sud, ORSAY

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