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Uncertainties, modelling and super-heavies

講師： デヴィット ボアイエ 教授
GANIL ノルマンディー大学

Professor David Boilley

GANIL and Normandie Université, France

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Following what was done with the International System of Units (SI), standardization of the evaluation of the uncertainty in measurement and modelling has been in progress for two decades [1]. This traditional approach assumes that a large number of data is available. But when one has to deal with a small numbers, other approaches based on Bayesian inference are necessary. In this presentation, I will first introduce the evaluation of uncertainty according to the international standards and Bayesian approaches. After this pedagogical introduction, I will present an application to research as there is a general trend to call for a careful evaluation of the uncertainties in modelling [2]. In particular, I will present our preliminary work on the estimation of the residue cross-sections of super-heavy elements [3], 250 years after the publication of Bayes theorem.

[1] *Guide to the Expression of Uncertainty in Measurement (GUM)*, <http://www.bipm.org>

[2] *Editorial: Uncertainty Estimates*, *Physical Review A* **83**, 040001 (2011)

[3] H. Lü and D. Boilley, *EPJ Web of Conferences* **62**, 03002 (2013)

連絡員 有友嘉浩 (内線 2955)