

## Short visit grant

### Travel details

This concerns the travel of P. Zinn-Justin from 09/03/05 to 12/03/05 to visit Jean-Bernard Zuber (zuber@lpthe.jussieu.fr) at Laboratoire de Physique Théorique et Hautes Energies (LPTHE Tour 24, Université Paris 6, 75231 Paris Cedex 05).

### Description of the work

The aim of this visit was to continue an ongoing collaboration concerning combinatorial properties of integrable loop models and related integrable stochastic processes. The exchange was quite fruitful and led to a number of results: (1) Certain combinatorial properties of the entries of the Perron–Frobenius eigenvector of the  $O(1)$  Brauer crossing loop model, observed and conjectured by J.-B. Z., were proved using newly discovered tools related to the deep connection between this model and algebraic geometry. Namely, the striking appearance of powers of 2 under various forms in these entries, which might sound anecdotic, is actually a manifestation of the fact that the degree of a complete intersection of quadrics is a power of 2. (2) We continued investigation of the  $O(1)$  Temperley–Lieb non-crossing loop model. Though we are still unable to prove the Razumov–Stroganov conjecture, our primary goal in this field, we can now prove it in special cases (configurations with three, perhaps also four or five arches).

This research should and will most definitely be pursued in the future. Though we are not currently writing an article together, it is clear that this line of work will result in the future in common publications, as it has already produced in the past.

Note also that closely related work – the paper “A scheme for the Brauer loop model” – by myself and another collaborator A. Knutson has been posted on the MISGAM ESF program website, with appropriate acknowledgments.