



## Research Networking Programmes

### Short Visit Grant or Exchange Visit Grant

*(please tick the relevant box)*

### Scientific Report

The scientific report (WORD or PDF file – maximum of eight A4 pages) should be submitted online within one month of the event. It will be published on the ESF website.

**Proposal Title:** On holographic topological entanglement entropy

**Application Reference N°:** 6948

1) Purpose of the visit

The purpose of this visit was to finalised work in progress with professor Andrei Parnachev (Trinity College Dublin) regarding the topological entanglement entropy in certain class of holographic systems.

2) Description of the work carried out during the visit

We have a lengthy discussions regarding how to presenting our result in the most accurate way as well as going through details calculation and assumptions we have made. We also realise that some of our calculation can be easily extended to certain range of parameter space in the model we consider.

3) Description of the main results obtained

We have manage to obtain a more presentable draft and found several mistakes in calculations and assumptions. Some of numerical error was found and fixed during the visit. We also find that there is a phase transition of entanglement entropy of a disc region when the meson spectrum behave like those of QCD.

**4) Future collaboration with host institution (if applicable)**

There are several interesting problem we stumble upon completing this work. This including the field theory origin of extremal black hole entropy when the dual field theory is define on higher genus surface, string theory origin of the Gauss-Bonnet theorem and extension of our setup to find similar structure in probe brane system. We wish to continue to work on aspects of these questions.

**5) Projected publications / articles resulting or to result from the grant (*ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant*)**

Once mistakes in the final section of the paper and in one of the appendix is fixed, we will publish the resulting paper benefited from this visit.

**6) Other comments (if any)**