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: SUBCRITICAL CONTACT SURGERIES AND THE TOPOLOGY OF SYMPLECTIC FILLINGS

Application Reference N°: 6932

1) **Purpose of the visit**

The goal of this visit was to meet with Paolo Ghiggini (Nantes – but currently long term visitor in Pisa), and Chris Wendl (University College London) to rework our preprint "SUBCRITICAL CONTACT SURGERIES AND THE TOPOLOGY OF SYMPLECTIC FILLINGS" and to find further results to be included in it, before submitting the final version to a journal for publication.

2) **Description of the work carried out during the visit**

We already had uploaded a first version of our article to preprint server arXiv.org (see http://arxiv.org/abs/1408.1051) before our meeting took place. In our paper we showed that a contact structure that looks as if it had been obtained by a subcritical surgery from another contact manifold, behaves up to a certain point as if this were true: Namely, if it admits a symplectic filling, then the cosphere of the surgery will be homologically trivial inside the filling. In dimension 5, we are even able to show that the cosphere must be contractible, but unfortunately our methods do not generalize to higher dimensions, and they seem to fail for an inherent reason.

By the time of our meeting, there was dissent in our group whether we should still believe if the contractibility statement might be

true in dimensions larger than 5 or not. During the meeting we tried to find a counter example, we worked on reducing assumptions in our statements and we polished the language and layout of the article.

3) **Description of the main results obtained**

Unfortunately, we have not been able to find the desired counter   example.
Instead we did manage to apply the results of our paper to show that many contact manifolds in dimension five look topologically like a connected sum, but actually are not. This disproves a possible generalization of a similar statement in dimension three. While this last result might not seem surprising if one takes into account that the larger dimension gives much more freedom, it would not be clear to us, what other methods might be used to obtain this result (at least in such a clean   way).
Even though our new result was not the one we were expecting, we are nonetheless not unsatisfied.

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

Currently we are not working on a common project, but this might change in the future.

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)*

We have updated our article "SUBCRITICAL CONTACT SURGERIES AND THE TOPOLOGY OF SYMPLECTIC FILLINGS" on the arXiv http://arxiv.org/abs/1408.1051, and we have submitted the paper to a journal. We have included an acknowledgement for the funding we have received from the ESF.

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