

ESF - Short Visit Grant - Final Report

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I have visited the University Rome 2 from May, 1 to May, 14, 2006. The purpose of my visit was collaboration with Errico Presutti and other members of Rome scientific community (F. Martinelli, T. Merola, C. Boldrighini) on problems concerning the statistical mechanics of systems with continuous symmetry.

Together with Errico Presutti we have started the study of one such system, of particles in \mathbb{R}^2 , having both internal and spatial degrees of freedom, which are coupled in such a way that the rotation invariance may be broken. We expect that in our model the formation of filaments takes place, and though the translation invariance is not broken, the rotational one can be absent. It looks as the system with discrete rotation invariance can be treated by studying the corresponding 1D particle system. We hope to show that phase transition indeed happens in it at high densities. More ambitious project is to study the case of continuous rotational symmetry.

I hope to visit the University Rome 2 again in October, 2006, to proceed with the study of the above project.

If it will be successful, we are going to publish our results.