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Final Report on the activity of Dr. Pier Vittorio Larocca
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Dr. Pier Vittorio Larocca is a third-year graduate student of the Phd School in Physics and is expected to graduate under our supervision in few months with a thesis on aspects on String Theory and String Field Theory.

During these years Pier Vittorio has been a good student. He attended all the required graduate courses: Astrophysical signals of particle dark matter (N. Fornengo), Analytical and numerical techniques for Feynman diagrams (S. Uccirati), The Berezinskii-Kosterlitz-Thouless phase transition: theory and Monte Carlo simulations (M. Hasenbusch), Finite temperature in Quantum Field theory (M. Nardi and C. Ratti), Anomalies in Field theories (M. Frau) and got good scores.

He also attended several doctoral schools and workshops in the field of String and Field Theory, like LACES 2014 and 2015 at the GGI Institute in Florence, the Summer School on String Theory and Holography 2014 in Lisbon, the Spring School on Superstring Theory and Related Topics 2015 and 2016 in Trieste and The 21st european string workshop 2015 in Leuven.

Pier Vittorio also did some support teaching activity (tutoraggio), for the courses of Mechanics (Laurea in Physics, 2015) and Mathematical Methods and Quantum Mechanics (Laurea in Material Science, 2014, 2015 and 2016).

The first subject of Pier Vittorio's research activity concerns the study of effective actions associated to open string models in presence of fluxes and in particular the possibility of giving a description of this kind in the case of $N=2^*$ Super Yang Mills theory. This subject has been initially investigated using Ramond-Neveu-Schwarz formulation of string theory, but unfortunately this work is still in progress. The interest in the second of Pier Vittorio's research line, Open String Field Theory, originated from the intent of studying the same flux compactification leading to $N=2^*$ Super Yang Mills theory from a different point of view. After a brief excursion into the construction of low energy effective actions from Open String Field Theory, Pier Vittorio has started using new computational techniques to analytically relate the D-branes moduli as they appear in the boundary state and the corresponding parameters in Open String Field Theory solutions. In particular he has been



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able to determine the relation by systematically computing Feynmann diagrams of Open String Field Theory involving one on-shell closed string and up to five external open strings. The results he produced are valuable and they will be part of a publication.

In his research activity, Pier Vittorio has shown to have a good potential, with sufficient determination and a good attitude for computational and numerical work. His publication record is not so good, but the difficulty of becoming familiar with the techniques of string theory, and string field theory in particular must be taken into account. Considering all his activities in these three years, we think that he is ready for graduating and we propose that he is given the possibility of defending his thesis in spring 2017.

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