

Scientific Report for Holograv – Short Visit Grant

Ilmar Gahramanov

Trieste, 20 July – 01 August 2014

1 Purpose of the visit

This is the scientific report for my visit to the International School for Advanced Studies (SISSA), Trieste, Italy in July–August 2014. The purpose of the short visit was to continue undergoing project with Lorian Bonora regarding the new solutions in open string field theory.

2 Description of the work carried out during the visit

- The work carried out during my stay in Trieste concerned on study of a new class of analytic solutions of open cubic string field theory. The new solutions are expressed in terms of open string star subalgebra KBc and has the following form [5]

$$\psi_b = c(K+1)Bc \left(\frac{1}{K+1} + b \right).$$

This class of solutions includes, in particular, the Erler–Schnabl solution [4] as a special case when $b = 0$. The new solutions are the tachyon vacuum solutions [1, 2, 3]. We computed the energy density corresponding to the solutions and it gives the $D25$ –brane tension, i.e. these solutions agree with the Sen’s first conjecture.

- During the visit I was able to discuss our current project and related subjects and get useful comments from Driba Tolla.

3 Main result obtained

- We showed that all new solutions agree with Sen’s conjectures, except the case $b = -1$. In order to check the Sen’s second conjecture we need to find the homotopy operator for our solution. It seems that for the case $b = -1$ the homotopy operator is singular, if we constructed it correctly. Therefore further work in this direction needs to be done.
- It is possible to write an analytic solution of open string field theory as a singular gauge transformation. We found the form of gauge transformation for our solutions and it has a singularity for $b = -1$ case.
- Clearly the solution for the case $b = -1$ is special and one needs to study it more carefully.

References

- [1] M. Schnabl, “Algebraic solutions in Open String Field Theory - A Lightning Review,” Acta Polytechnica 50, no. 3 (2010) 102 [arXiv:1004.4858 [hep-th]].
- [2] Y. Okawa, “Analytic methods in open string field theory,” Prog. Theor. Phys. **128** (2012) 1001.
- [3] L. Bonora, “String Field Theory: a short introduction,” PoS ICMP **2013** (2014) 001.
- [4] T. Erler and M. Schnabl, JHEP **0910** (2009) 066 [arXiv:0906.0979 [hep-th]].
- [5] I. Gahramanov, “New Erler–Schnabl like solution in OSFT”, talk at the Nordic String Meeting, AEI, 3-4 February 2014

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01/08/2014	15:02	Venezia Mestre	Milano Centrale	01/08/2014	17:25	2

Train: FrecciaBianca **9730** Service: **2° Classe**; Coaches: **9**; Seats: **16A,17A**

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PNR: **MQEYR5**

* Total Amount Paid: **38.00 EUR**

* The amount paid is related to transactions subject to VAT

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= 19 EUR

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Tickets purchased by: **ILMAR GAHRAMANOV**

Loyalty Code: **130457350**

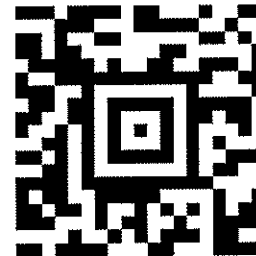
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20/07/2014	18:05	Milano Centrale	Trieste Centrale	20/07/2014	22:22	2
Train: FrecciaBianca 9741		Service: 2° Classe ; Coaches: 8 ; Seats: 16A,17A				
Channel: Internet B2C			PNR: MQEYR5			

* Total Amount Paid: **58.00 EUR**

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Economy-ADULTO 2° CLASSE	8	17A (Window)	--	: ADULTO		629206	--

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Master Code: **222614342795**

Tickets purchased by: **ILMAR GAHRAMANOV**

Loyalty Code: **130457350**

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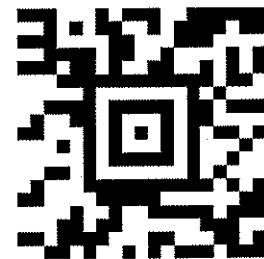
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01/08/2014	13:01	Trieste Centrale	Venezia Mestre	01/08/2014	14:52	2
Train: Intercity 594		Service: 2° Classe ; Coaches: 3 ; Seats: 55,56				

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PNR: **MQEYR5**

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FLIGHT DEPARTS

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SEAT NUMBER

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SEAT NUMBER

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TO

(SXF) Berlin Schoenefeld

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PASSENGER

GAHRAMANOV, ILMAR Mr

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