String theory group at the University of Milan

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Università degli Studi di Milano

1.–5.10.07 / RTN workshop, Valencia

Outline

Who pull the strings at Milano 1

Resources

Research activities

Publications since October 2006

Work in progress: wrapping interactions in $\mathcal{N} = 4$ SYM

Who pull the strings at Milano 1

staff: Dietmar Klemm
            Alberto Santambrogio
            Daniela Zanon

postdocs: Stephane Detournay
            Rodrigo Olea
            Christoph Sieg

PhD students: Frederico Elmetti
                Francesco Fiamberti
                Diego Mansi
                Andrea Mauri
                Giovanni Talgliabue
                Emanuele Zorzan

Resources

University of Milan

Physics Department

## Ist. Naz. di Fisica Nucleare

MIUR Cofinanced project
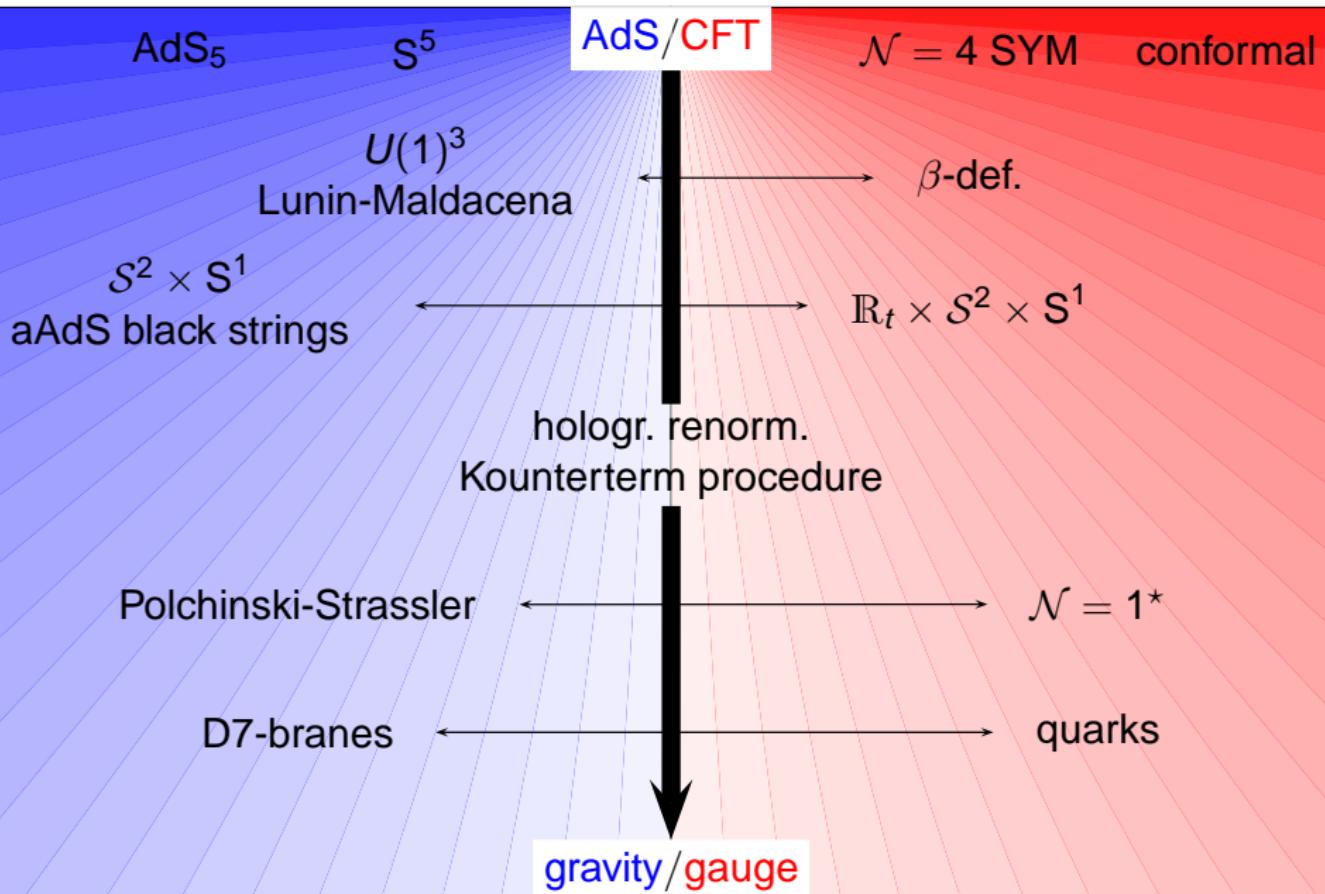
RTN
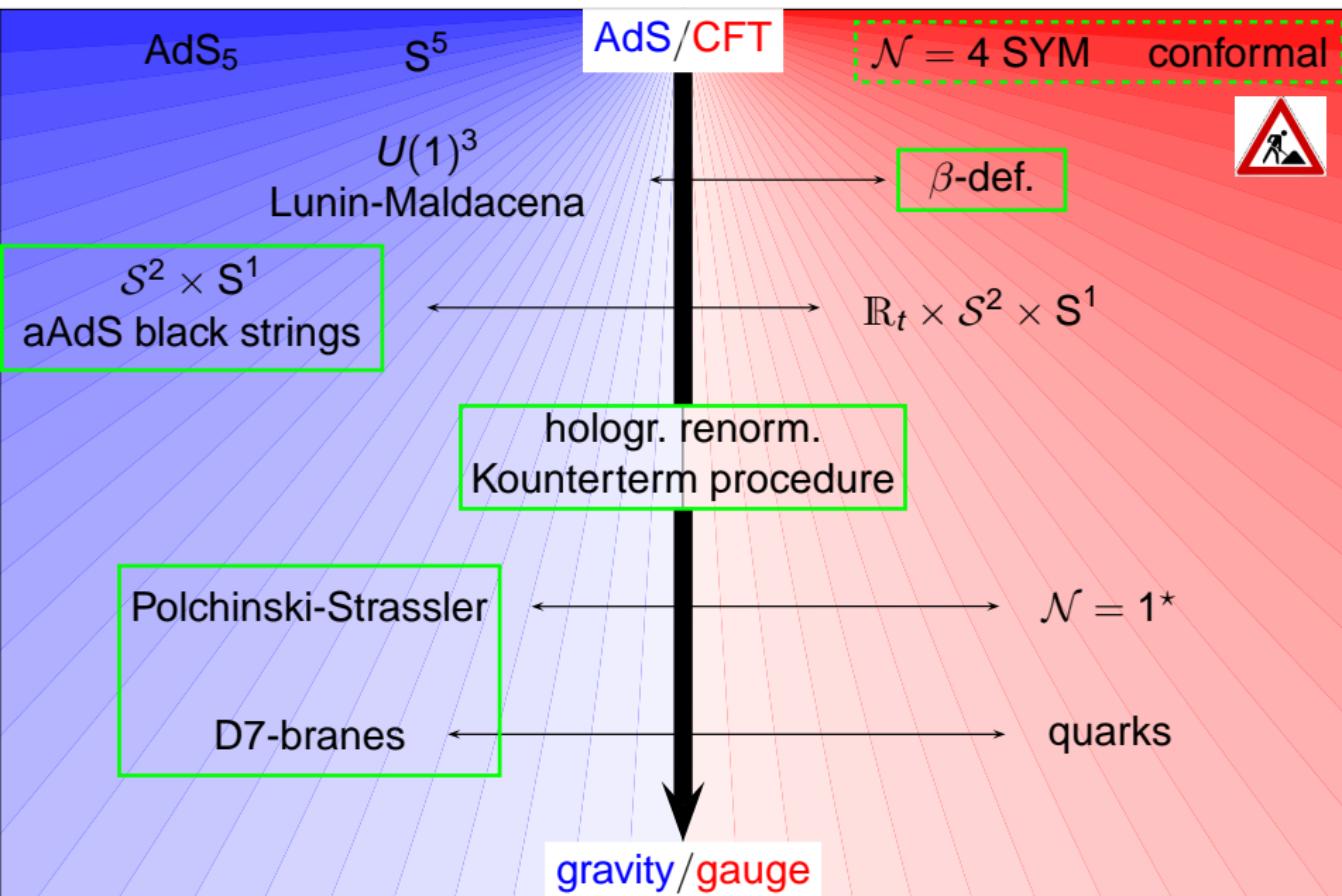
Research activities

- Deformations of the $\mathcal{N}=4$ super Yang-Mills theory and AdS/CFT correspondence
- Integrability in $\mathcal{N}=4$ super Yang-Mills
- Spinorial geometry and classification of supergravity solutions
- Black hole solutions in string theory
- An alternative regularization scheme for AdS gravity
- String theory and noncommutative geometry

Work in gravity/gauge correspondences

AdS$_5$ S^5 AdS/CFT $\mathcal{N}=4$ SYM   conformal

$U(1)^3$
Lunin-Maldacena   ⟷ β-def.

$\mathcal{S}^2 \times$ S^1
aAdS black strings   ⟷ $\mathbb{R}_t \times \mathcal{S}^2 \times$ S^1

hologr. renorm.
Kounterterm procedure

Polchinski-Strassler   ⟷ $\mathcal{N}=1^\star$

D7-branes   ⟷   quarks

gravity/gauge

Publications since October 2006 (no proceedings)

journal

β-deformed $\mathcal{N} = 4$ SYM

    Elmetti, Mauri, Penati, Santambrogio, Zanon: 0705.1483   –

(classification of) supersymmetric solutions

    Caldarelli, Klemm, Zorzan: 0610126   CQG

    Cacciatori, Caldarelli, Klemm, Mansi, Roest: 0704.0247   JHEP

aAdS$_5$/CFT$_4$

    Bernamonti, Caldarelli, Klemm, Olea, Sieg, Zorzan: 0708.2402   –

holographic renormalization, Kounterterms

    Olea: 0610230   JHEP

    Miskovic, Olea: 0706.4460   –

    Kofinas, Olea: 0708.0782   –

gravity$_3$/CFT$_2$

    Compere, Detournay: 0701039   JHEP

    Klemm, Tagliabue: 0705.3320   –

holographic flavour in Polchinski-Strassler/quarks in $\mathcal{N} = 1^\star$

    Apreda, Erdmenger, Lüst, Sieg: 0610276   JHEP

    Sieg: 0704.3544   JHEP

Work in progress: wrapping interactions in $\mathcal{N} = 4$ SYM

▶ action of the dilatation operator $\mathcal{D}$ on length four operators $\mathcal{O}_4$
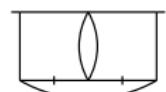
$$\mathcal{D}\,\mathcal{O}_4 \;=\; \underbrace{\sum_{k=0}^{3} \boxed{\mathcal{D}_k} \;+\; \boxed{\mathcal{D}_4}}_{\text{universal part}} \;+\; \boxed{\mathcal{D}_4} \;+\; \mathcal{O}(\lambda^5)$$

<div style="text-align:center">

universal part   finite size effects:
wrapping interactions

integrability   Feynman diagrams

</div>

▶ perturbation theory at four loops:

   ▶ Supergraph techniques

   ▶ computation of loop integrals like   , e.g. with the

     Gegenbauer polynomial x-space technique