# High Energy Theory Group at "Turin Polytechnic"

*Emanuele ORAZI*

*Turin Polytechnic , Italy*

*&*

*INFN , Turin, Italy*

RTN workshop

Valencia, Spain, 1-5 october 2007

# Outline

- People at Turin Polytechnic
- Resources
- Main Research Activities
- Publications
- Recent Works
- Work in Progress

# People

| | |
|---|---|
| Full Professor : | Riccardo D'Auria |
| Researcher : | Laura Andrianopoli |
| Visiting Professor : | Mario Trigiante |
| Postdoc : | Emanuele Orazi |

# Resources

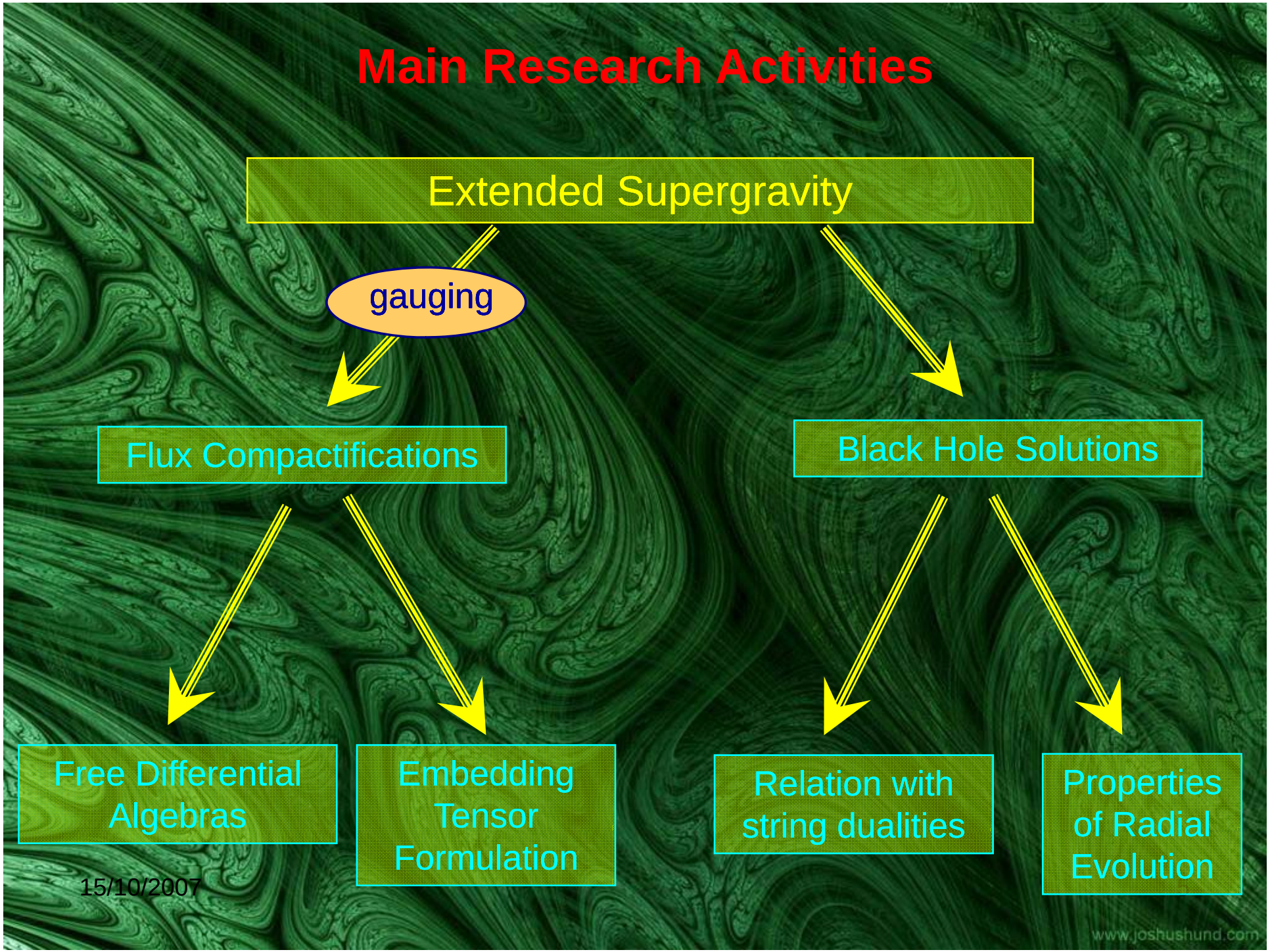
Politecnico di Torino
Physics Department


Istituto Nazionale di
Fisica Nucleare

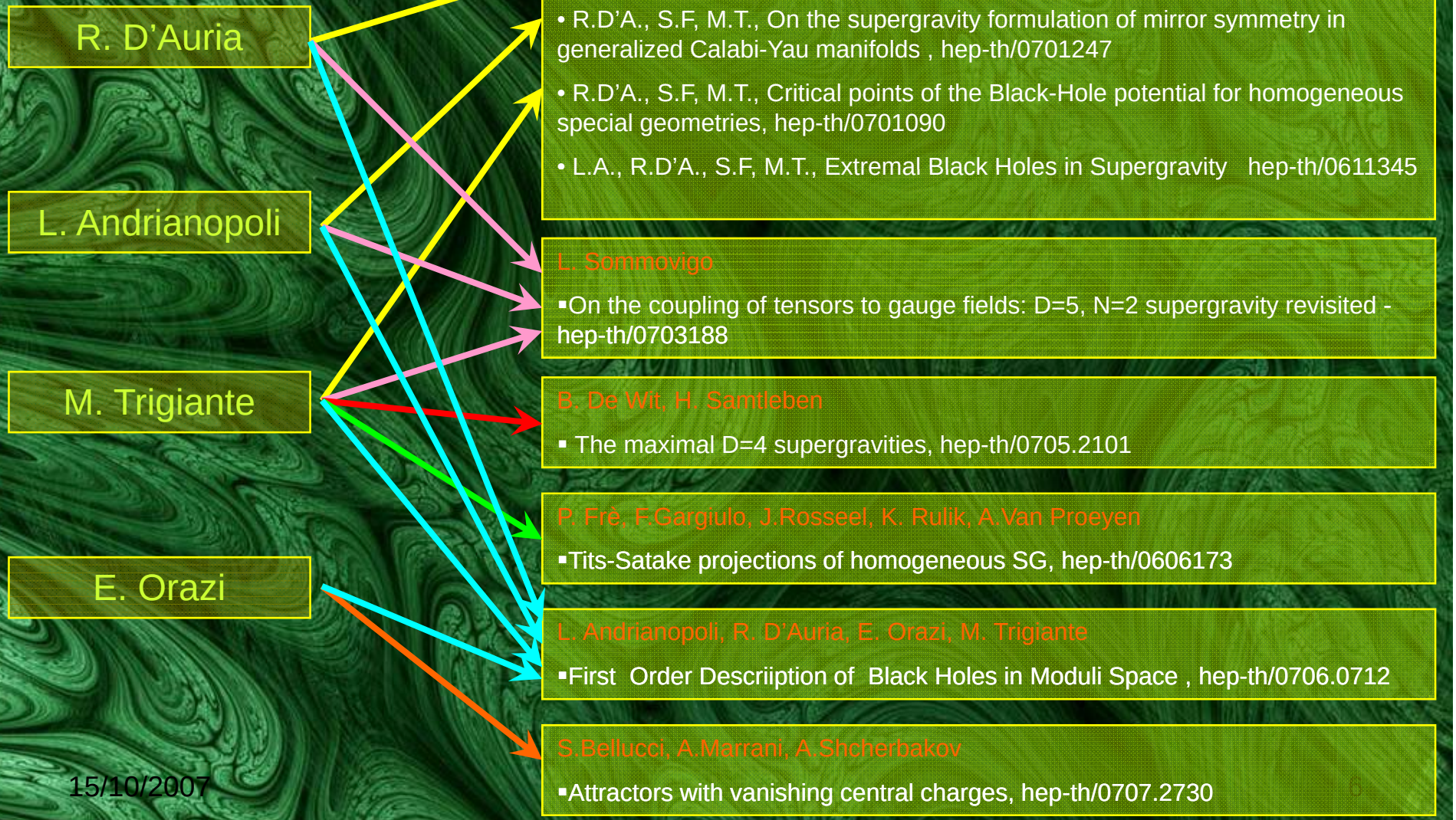

MIUR
Cofinanced Project

Research Training
Network

# Main Research Activities



# Publications (since october 2006 – proceedings excluded)




S.Ferrara

- L.A., R.D'A., S.F, M.T., Black-Hole Attractors in N=1 Supergravity hep-th/0703178
- R.D'A., S.F, M.T., On the supergravity formulation of mirror symmetry in generalized Calabi-Yau manifolds , hep-th/0701247
- R.D'A., S.F, M.T., Critical points of the Black-Hole potential for homogeneous special geometries, hep-th/0701090
- L.A., R.D'A., S.F, M.T., Extremal Black Holes in Supergravity hep-th/0611345

L. Sommovigo

- On the coupling of tensors to gauge fields: D=5, N=2 supergravity revisited - hep-th/0703188

B. De Wit, H. Samtleben

- The maximal D=4 supergravities, hep-th/0705.2101

P. Frè, F.Gargiulo, J.Rosseel, K. Rulik, A.Van Proeyen

- Tits-Satake projections of homogeneous SG, hep-th/0606173

L. Andrianopoli, R. D'Auria, E. Orazi, M. Trigiante

- First Order Descriiption of Black Holes in Moduli Space , hep-th/0706.0712

S.Bellucci, A.Marrani, A.Shcherbakov

- Attractors with vanishing central charges, hep-th/0707.2730

# First Order Description of Black Holes in Moduli Space

L.Andrianopoli, R.D'Auria, E.Orazi, M.Trigiante

- We consider the bosonic sector common to all extended supergravities, whose equations of motion can be reduced to a first order system of differential equations

$$\ddot{U} = V_{BH}(\varphi, p, q) e^{2U}$$

$$\ddot{\varphi}^r = g^{rs}(\phi) \frac{\partial V_{BH}(\varphi, p, q)}{\partial \phi^s} e^{2U}$$

$$\left(\dot{U}\right)^2 = V_{BH} e^{2U} - \frac{1}{2} g_{rs}(\varphi) \dot{\varphi}^r \dot{\varphi}^s$$

$$\longrightarrow$$

$$\dot{U} = W(\varphi) e^{U}$$

$$\dot{\varphi}^r = 2 e^{U} g^{rs} \partial_s W$$

$$V = W^2 + 2 g_{rs} \partial_r W \partial_s W$$

where we restricted our attention to the extremal case and we assume that $\partial_\tau W = 0$

For homogeneous spaces with N>2, we propose the following prepotential

$$W = \sum_M \alpha^M e_M$$

There is a one-to-one correspondence between the sets of allowed coefficients (up to 3 choices) and the BH solutions

Skew eigenvalues of central and matter charges (H-invariants)

that properly reproduces the general expression of the BH potential

$$V_{BH} = \frac{1}{2} Z_{AB} \bar{Z}^{AB} + Z_I \bar{Z}^I$$

Concerning the non extremal case ($c \neq 0$, $\partial_\tau W \neq 0$), all we can say is that at least a particular class of black holes admits a first order description but it is not valid in general

*Thank You!*