

# Summary WG1 meeting

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# Spin-down phase of black hole evolution

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The University



## Conclusions

“Spin-down” phase of evaporation of brane black holes

- Hawking radiation has strong angular dependence
- Rotating black holes emit fewer particles, with higher energy
- “Spin-down” phase significant for most of the life of the black hole

# (New) entropic (and) classicality condition(s) for brane-world black holes

(Light or not light black holes?)

Roberto Casadio  
(Bologna University and INFN)

ECost meeting WGI  
Bologna

Two (three...) scenarios

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13 April 2011

$$M_{\text{deg}} \simeq M_C \simeq \frac{M_G}{\sqrt{q}}$$



Work (in progress) with G.L. Alberghi, O. Micu, A. Orlar

$q \simeq 1$  → Brane-world microscopic black holes similar to 5D ADD

$q \gg 1$  → Brane-world black holes at LHC even if  $M_G \gtrsim 10$  TeV  
and bulk graviton exchanges suppressed

$q \ll 1$  → No black holes at LHC even if  $M_G \simeq 1$  TeV  
and bulk gravitons detectable



I) Black holes found at LHC → Extra dimensions!

II) Black holes not found at LHC → Not clear...

## Cosmological production of noncommutative black holes

Piero Nicolini

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Institute for Theoretical Physics, Goethe University Frankfurt  
Frankfurt am Main, Germany

R. Mann and P. N., arXiv:1102.5096 [gr-qc]  
Bologna, April 2011

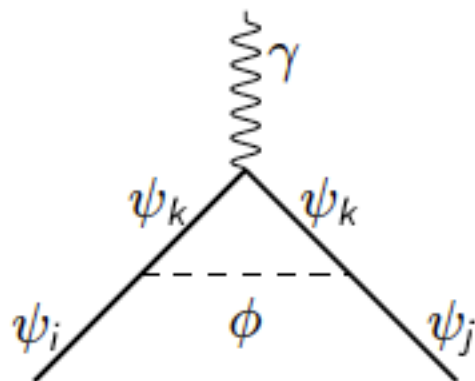
### Summary

- ▶ Regular NC-Schwarzschild-deSitter solutions
- ▶ one, two, three or no horizon
- ▶ solutions for positive and negative mass parameter
- ▶ stable thermodynamics  $T \rightarrow 0$ ,  $T_c > T_{dS}$
- ▶ deSitter space is at the present time stable in agreement with experience.
- ▶ the production is relevant only for  $\Lambda G \sim 1$
- ▶ Planck size black holes would not have been produced
- ▶ potential instability toward production of  $M < 0$  solitons.

## Quantum Black Holes

Nina Gausmann

Theoretical Particle Physics  
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- 1 anomalous magnetic moment  
(e.g. of  $\mu \rightarrow \bar{M}_P > 2 \times 10^8 \text{ GeV}$ )
- 2 “forbidden” lepton flavor violating processes  
(e.g.  $\mu \rightarrow e\gamma \rightarrow \bar{M}_P > 7.2 \times 10^{12} \text{ GeV}$ )

Experimental bounds on EDM of leptons and quarks  
(or e.g. for neutron, if no further suppression factors  
 $\bar{M}_P > 4.5 \times 10^{16} \text{ GeV}$ )

# On the Production of Primordial Black Holes in Inflationary Cosmology

Claus Kiefer

Institut für Theoretische Physik  
Universität zu Köln

- ▶ Significant production of PBHs possible in inflationary cosmology with broken scale invariance;
- ▶ this could yield a significant part of cold dark matter
- ▶ Influence of non-Gaussian fluctuations?  
(cf. Bullock and Primack 1997)
- ▶ How was inflation realized (if it was)?
- ▶ Formation of **quantum** PBHs?

# Discussions

- Creating (finding funding for) a network on the theme of quantum gravity in the universe.
- Writing a book? In which form?
- STFC/visits.
- Hot topics/research ideas.