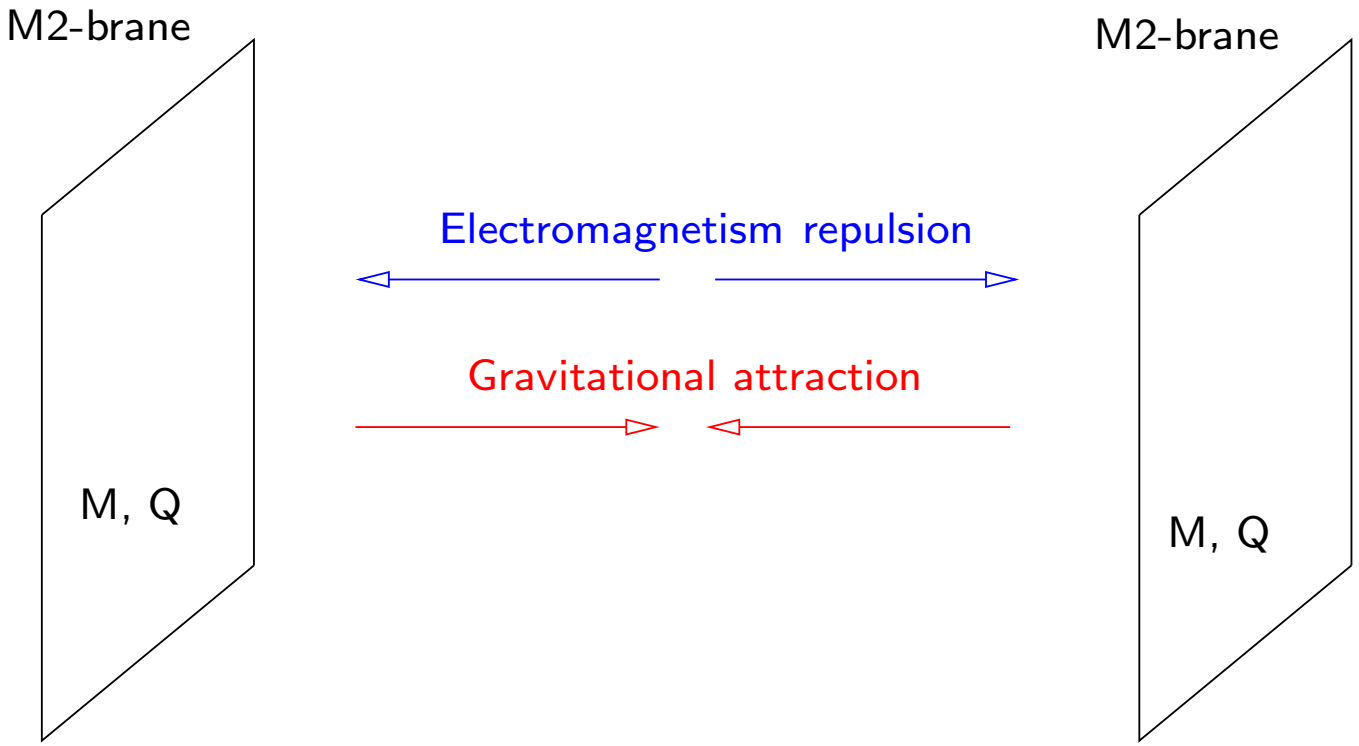
Max-Planck-Institut
für Gravitationsphysik
(Albert-Einstein-Institut)

From floating branes to soaring branes

Clément Ruef

IPhT, CEA Saclay, November 17th 2011

Floating brane and extremality



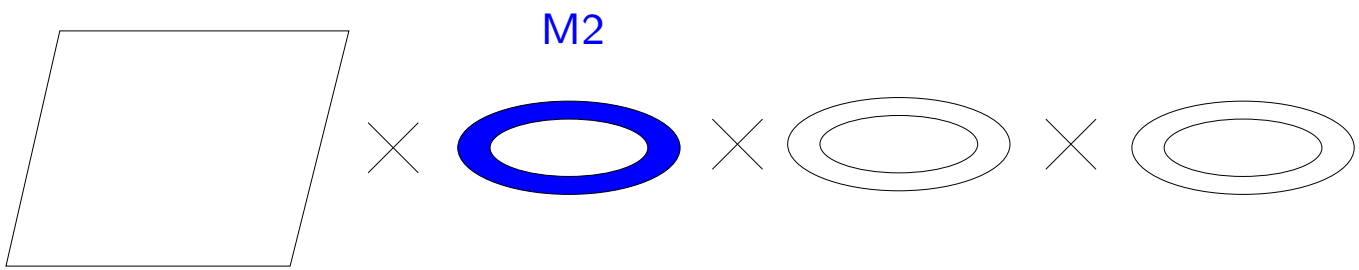
For $M = Q$, no global force, the branes are **mutually BPS**.

Implied by SUSY

Floating brane and extremality

How to make use of it ?

Floating brane Ansatz : Background such that a DBI-probe (M2-)brane feels no force



Floating brane Ansatz $\leftrightarrow$ Extremality requirement

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The floating-brane Ansatz has proven to be very useful :

- Solving SUSY equations of motion in a linear way
- Generalizing this linearity to equations describing non-SUSY solutions

  $\hookrightarrow$ **Very efficient to construct explicit solutions**

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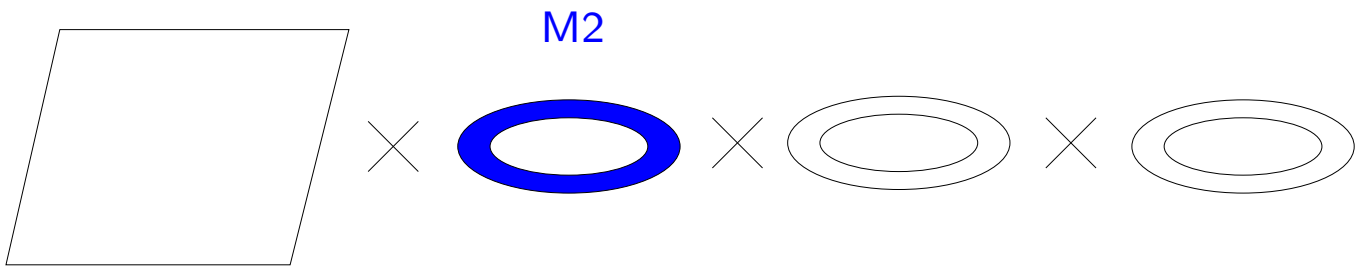
Is it possible to generalize the idea to non extremal solutions ?

Non extremal M-branes

Let us probe a non-extremal M-branes background :

$$M \neq Q,\ T \neq 0$$

Idea : Probe brane with velocity along an internal direction



Soaring branes

DBI action for the probe brane :

$$S_{DBI} = \int d^3z \sqrt{g} + \int A^{(3)}$$

For an imaginary velocity v, a no force condition is possible !

$$M = \frac{1}{\sqrt{1-v^2}} Q$$

This probe brane reveals a hidden structure of the background.

Generalisation

Behaviour much more general :

- general static non-extremal D-branes solutions
- JMaRT solution (bubbled non-extremal two-center smooth solution)
- non-extremal black ring
- Rasheed-Larsen D0-D6 black hole

Discussion

Summary

- A no force condition on probe branes even for non extremal background
- Cost : imaginary velocity
- True for many highly non trivial solutions
- Indicator for some structure in the background

Questions

- How general is it ? Can we classify "soaring-brane" solutions ?
- Is it possible to use it as an input for new solutions ?