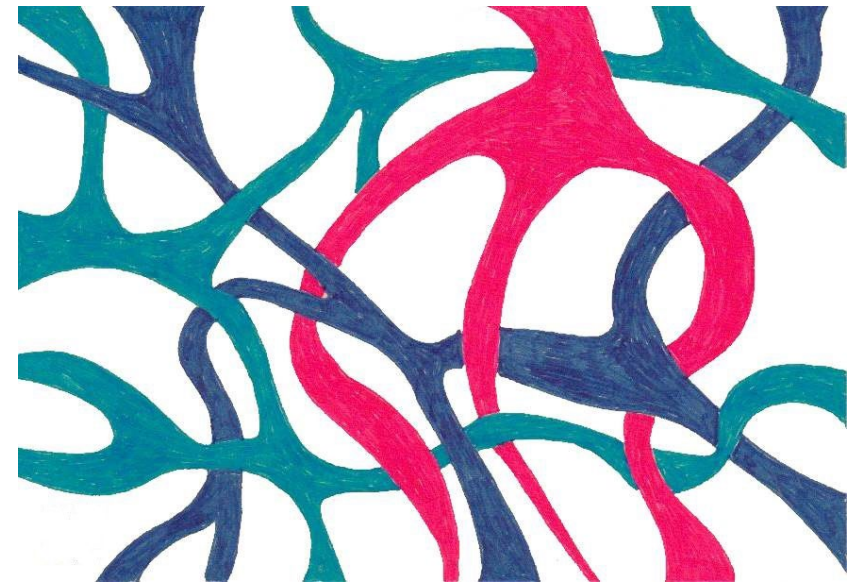




STRING THEORY AND GENDER: A EUROPEAN EXPERIENCE

COST ACTION MP1210

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FlipPhysics Workshop
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Some key words about String Theory

It is a branch of theoretical physics and mathematical physics whose ultimate goal is to describe in a **unified theory all the forces of Nature**: electromagnetic force, nuclear forces and gravity.

Moreover, it intends to be the place where **Einstein's theory of gravity and quantum physics** can reconcile.

Typical questions that we pose:

¿What is the nature of matter and light?

¿What is the fabric of spacetime?

Some peculiarities...

- There are few applications (something that is starting to change).
- It is very difficult to make experimental predictions.
- It has been source of inspiration in different fields in Mathematics.

In this 'oven' many ideas and new methods to understand fundamental physics have been cooked.

No area is free from subjectivity but perhaps the the lack of contact with the experiment accentuates the unconscious bias. ¿Who decides what result is important and what one is not?

It is a very competitive research field.

- There is a chronic deficit in the number of positions compared to the number of candidates that want to work in the field.
- Young researchers must mature and show independence very soon. On the other hand, the post doctoral adventure is very long (up to the age of 35 or more), with movings every 2 or 3 years. Moreover, it is very uncertain.

In Europe only 10-15% of researchers with permanent positions are women.

And these numbers are NOT changing much.

Often, one woman is the only one in her group of research. We would be together in conferences but the isolation was important.

For many years some women had wanted to organize but the ambient was not favourable

Only pointing out the obvious disproportion
to our colleagues was a challenge.

Also, some women would think that these numbers were **irrelevant** and nothing could (or should) be done.

Caltech'2000. *'Strings at the Millenium'*. Women that by then had an established career were very reluctant to take any action.

After all they had worked very hard, against the current, and being labelled as **'activist'** or **'feminist'** may make them look as **non professional**.

The mantra was:

PHYSICS HAS NO GENDER

In grants and European networks the gender question was treated on tiptoe, as if it was something no to stir up.

Around 2012 some women started to think that something should be done.

Talking to each other we realize that there was an **objective problem**: we had all suffered the same unpleasant experiences at work. For example, microsexim was rampant. It was not an individual problem, as we had thought due to isolation.

‘- When did you realize that you were women?’

-Mainly after the PhD, when competition becomes more serious’

Scientists are involved in the **education** of the next generation, so their responsibility is enormous.

We had to help the young ones.

We applied for a COST Action in the European Union to establish and enhance collaborations and interchange of knowledge via collaborations, short visits, workshops...

It was a **scientific project**, but with an **accent on gender** that would allow us to take a step forward and talk openly about our problems.

It was not easy, referees would not understand. Sometimes they thought that we were looking for an excuse to obtain the money. And they would repeat the mantra:

PHYSICS HAS NO GENDER

Finally we passed the first filter.

It was a fantastic experience of collaboration among women

Then, we involved the rest of the community in order to prepare a more detailed project.

It was important to involve also men:

- A network in String Theory reserved only for women was nonsense and would not achieve the networking goals.
- It would divide the community.
- The information about gender problems had to be spread among male and female scientists. Most of them had never thought about it, and sometimes, they didn't even think there was a problem:

'If they don't want to study physics , why do you want to push them?'

The response of our male colleagues was very good.
We realized that not only Physics, also

GENDER HAS NO GENDER

Finally the Action was approved.
It worked for four years, [2013-2017](#).

Since we had initiated it, we could put many women in key positions:

- *Chair* and *Vicechair* were both **women**
- In several Working Groups women acted as **leaders**.
- We created a special Working Group about **Gender and Outreach**.

ACTIVITIES

- **Visibility:** In our conferences we tried to have a balance. In the selection of scientific committees and invited speakers the percentage of women was higher than 10-15%. For the first time! It used to be lower.
- **Events of outreach** carried out by women. A way to serve as role models. They were a success.
- **Gender events in each conference:**
 - A women's lunch.
 - A talk followed by a discussion. I did the first talk and then we had several people. I would mention for its significance,

- Professor Conny Aerts, accomplished Belgian astrophysicist, which gave us a talk on *'Work-life relation as an astromama and some gender tips'*.



She, for example, thought that thanks to the 5 year that grant she had in her post doctoral period she could make it.

It followed an interesting debate on paternity/maternity leaves.

We could talk about unconscious bias, segregated education, subliminal messages in the environment, paternity/maternity, the requirement of mobility in the post-doctoral period...

Talking about the unconscious bias, for example, there was **surprise** and **denial**: some physicists seem to believe they didn't have an unconscious

'Come on, we are smart people'.

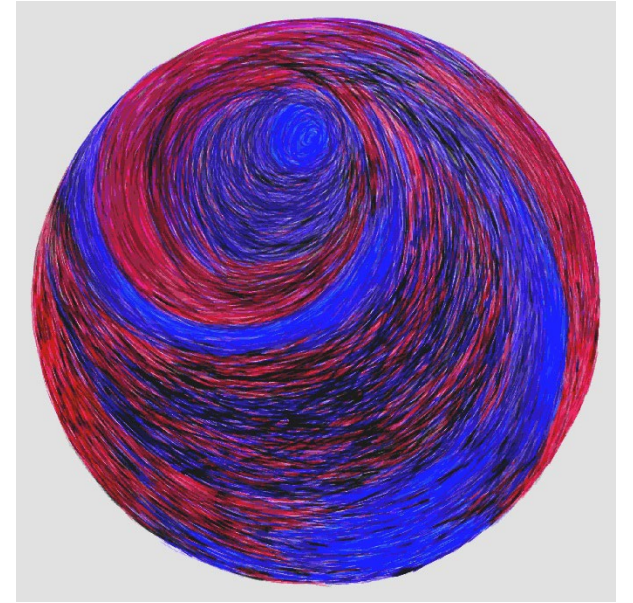
We also experienced a sensation of **relief**.

Many women, including the youngest ones, started to tell their experiences working in a mainly male environment.

A taboo was broken.

- **First Workshop on Strings and Gender**
València (SPAIN) July 2015

We put together physicists and gender experts.



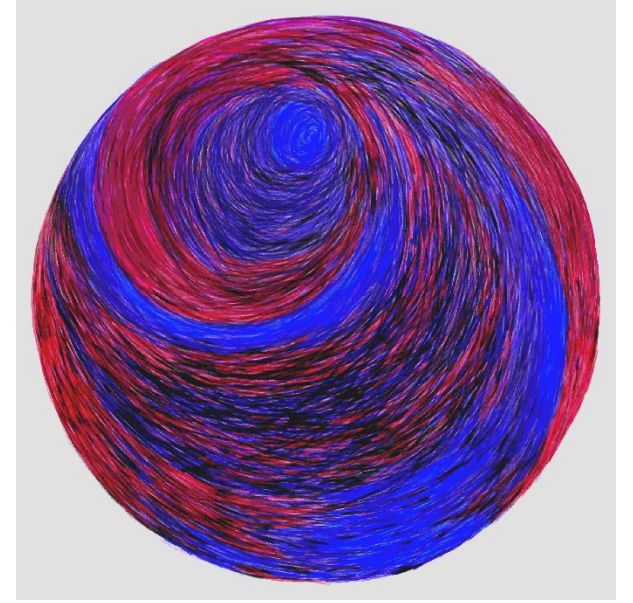
Neuroscientist. We learnt that the dichotomy **male brain/ female brain** does not exist.

The brain is plastic in adult age, so there is opportunity for change.

Prof. Gina Rippon.
Aston University, UK



Prof. Capitolina Díaz
Universitat de València.
Spain



European Union policies on gender
and science.

- 2016 'Second Workshop on Strings and Gender' París.
- 2017 'Third Workshop on Strings and Gender'. Southampton.
- 2018 'First Workshop on High Energy Theory and Gender'. CERN.

We also attended several **Gender Summits**, presenting contributions.

Mail list WomenHET:

<http://pegaso.ific.uv.es/mailman/listinfo/womenhet>

Comedy 'Corollaries'

For the last conference, in Milan, 2017. We collected anonymously anecdotes of **microsexism** of the women in the network:

'...situations happening in everyday life that, like a little but constant drop, end up making a hole in our self-esteem or embittering to a certain degree the relation with our colleagues'

Many anecdotes would **repeat patrons** and some of them were very painful.

Choosing the most representatives among them, a professional writer wrote a screen play and three professional actors represented it in the same auditory than the conference.

It was a hit!

The COST Action "The String Theory Universe", presents

$$R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R = 8\pi T_{\mu\nu}$$

COROLLARIES

$$ds^2 = - \left(1 - \frac{2M}{r}\right) dt^2 + \left(1 - \frac{2M}{r}\right)^{-1} dr^2$$

A play directed by **FABIO SCAMONI**

with **CATERINA CORSI**

NICOLA LUDWIG

PATRIZIO LUIGI BELLOLI

Thursday, February 23 at 17:30, room U4-08

When the Action finished we launched an informal survey among the participants. These were the most important results.

- Women feel the burden of **family responsibilities** much more than men.
- Most of the participants felt that the **mobility** required during the post doc time is exaggerated. Maybe, in the internet age, the community is ready for a change of model.
- When asked about **maternity/paternity** comparable and non-transferable most of the participants (also men) agreed that it would be an adequate policy.
- Many institutions do not have clear rules about **sexual harassment** at work. Others had them, but their workers said not to be informed. A considerable amount of men say that they did not know, but if the case is presented to them they could rapidly get the information.

Lessons we learnt

- We are not gender experts, but we can do a lot to **change things**.
- **In each step of the career many women leave physics**. To promote equality we have to help and support women at each stage: primary and secondary school, University, PhD... Even the ones that have a consolidated career may need help. No one of them should be lost.
- The **prejudices, microsexism and unconscious bias** are very powerful and it is hard to fight them. But being aware of them is already a change of paradigm.

- There are many factors at play and we haven't identified all of them. Why the Nordic paradox?
- Why in places as Palestine or Iran more than half of the Physics students are female? In their cultures, they don't consider Physics as a 'male subject'.
- **There are many programs** (EU, nationals) addressed specifically for the equality of gender in science. But many of us have felt isolated. Why those programs do **not involve us directly**?