

CIENCIA EX AEQUO

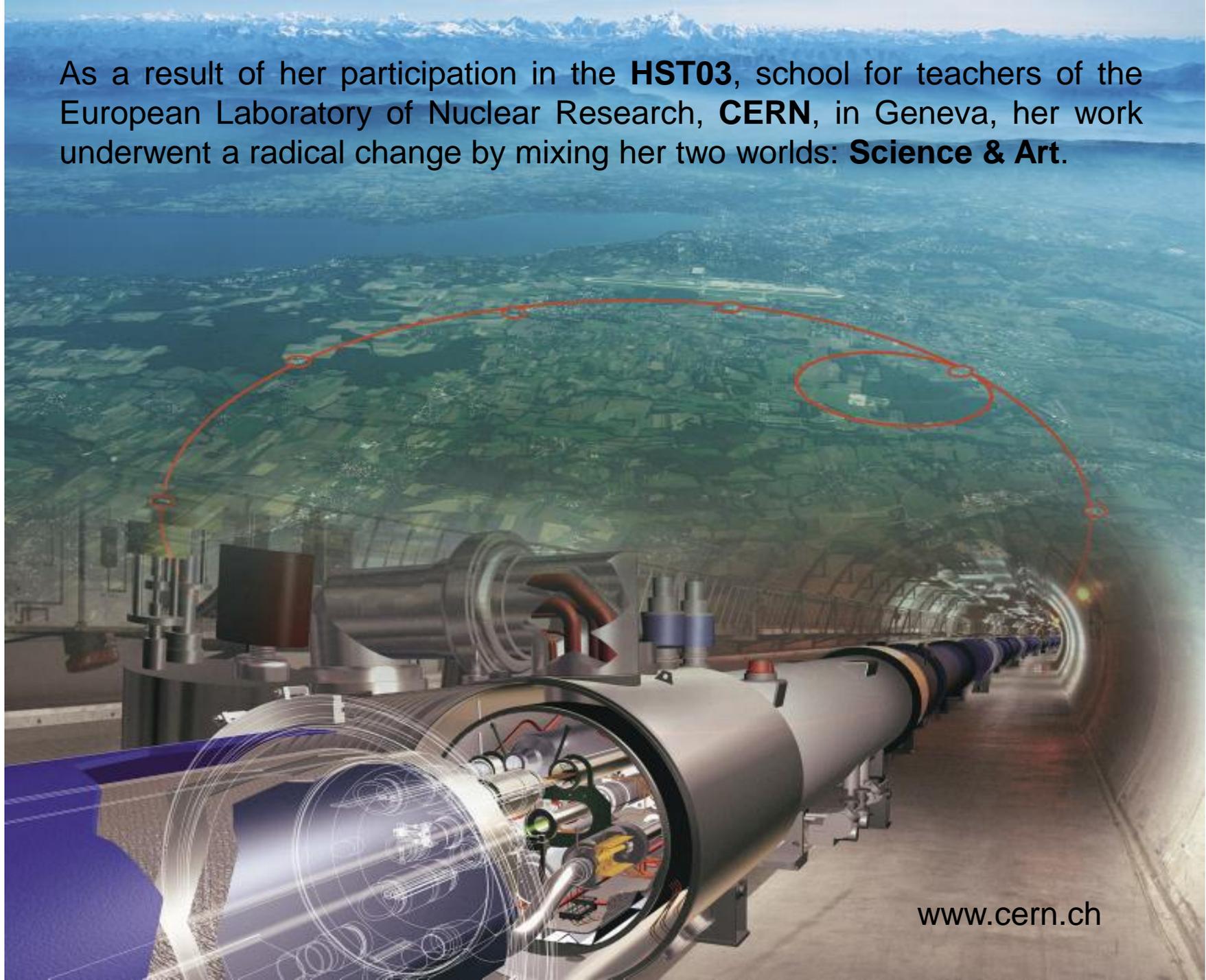
CIMADEVILA

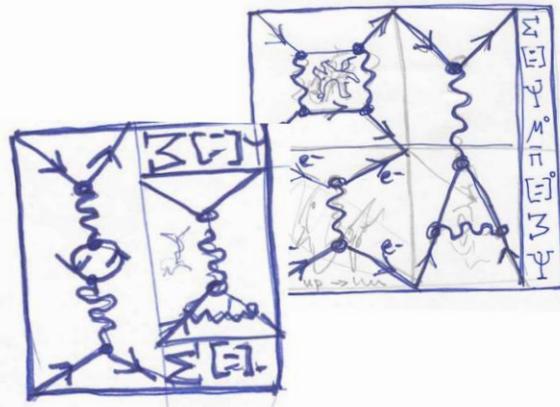
IPAC 2011

Margarita **Cimadevila** was born in Sada, Galicia, Spain. She graduated in Chemistry and is working as a teacher and as a painter. At present, she is the headmistress of the High School **IES Urbano Lugrís** in A Coruña.



As a result of her participation in the **HST03**, school for teachers of the European Laboratory of Nuclear Research, **CERN**, in Geneva, her work underwent a radical change by mixing her two worlds: **Science & Art**.





SCIENCE & ART

"PARTICLE PHYSICS"

CERN HST 2003

M. Cimadevila (Spain)

EXIT
DO NOT
BLOCK



POSTERS
COULDN'T BOXES
MUSIC
PARTY

POSTERS
COULDN'T BOXES
MUSIC
PARTY

CERTI
FOOTB
GU



CIENCIA EX AEQUO



Ciencia EX AEQUO pays a tribute to women who, having done a wonderful job and deserving to be acknowledged for their work, were ignored, forgotten or relegated to a less important status in favour of their male superiors, colleagues or competitors...

CIENCIA EX AEQUO



Previous to the start of the artistic work, a research about women, who suffered this discrimination, was carried out, and the cases found were so many that a decision was made to focus on twelve.

THE PAINTINGS

- Lise Meitner. Nuclear fission.
- Ida Tacke. Rhenium.
- Annie Cannon. Stars, spectral types.
- Cecilia Payne. Stars of Hydrogen and Helium.
- Chien-Shiung Wu. No conservation of parity.
- Marguerite Perey. Francium.
- Emmy Noether. Noether's theorem.
- Rosalind Franklin. ADN. Photograph 51
- Jocelyn Bell. Pulsars.
- Nettie Stevens. Chromosomes and sex.
- Henrietta Leavitt. Period/ brightness in variable stars.
- Inge Lehmann. Inner core of the Earth

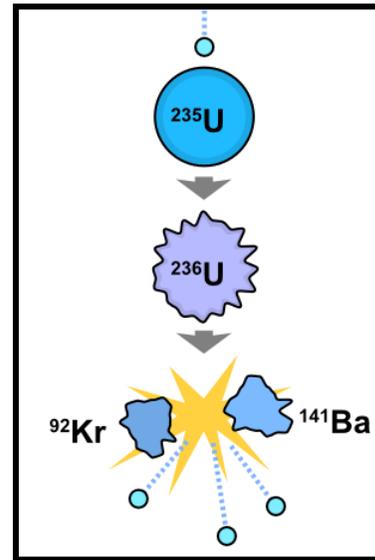
The source of inspiration was the scientific topic each of these women worked on.



LISE MEITNER. Physicist. Austria(1878-1968)

She made the calculations leading to the discovery of **nuclear fission**. It was only her collaborator, who never mentioned her in his report to the Academy, who received the Nobel Prize for the discovery.

Nuclear fission happens, when the nucleus of an atom splits into two or more smaller nuclei. The process releases a great amount of energy, but it is very difficult to control and the resulting products are highly radioactive.



Nuclear fission of Uranium 235 provoking Krypton, Barium, 3 neutrons and ENERGY.



LISE MEITNER. Nuclear fission



LISE MEITNER. Nuclear fission

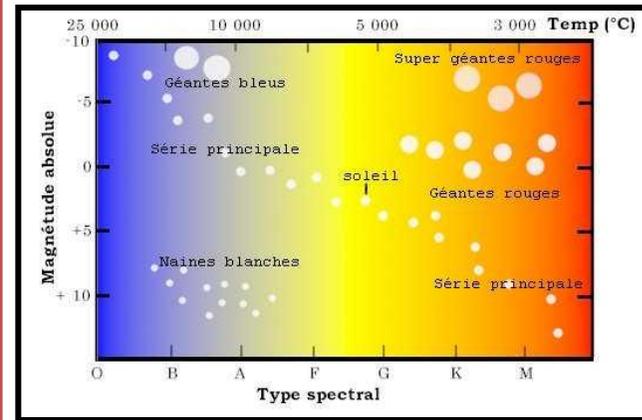
1X1m, mixed technique on canvas



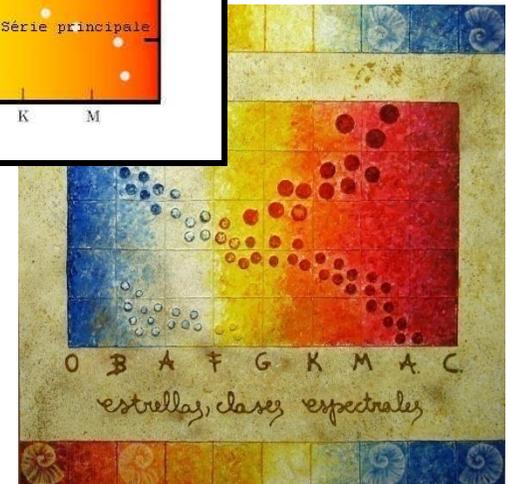
ANNIE CANNON. Astronomer. USA (1863-1941)

At the beginning of the 20th century, only women worked at the Harvard College Observatory, because it was cheaper labour. Annie Cannon, continuing the work of other astronomers, catalogued thousands of stars compiled in a nine-volume catalogue in which she does not even appear.

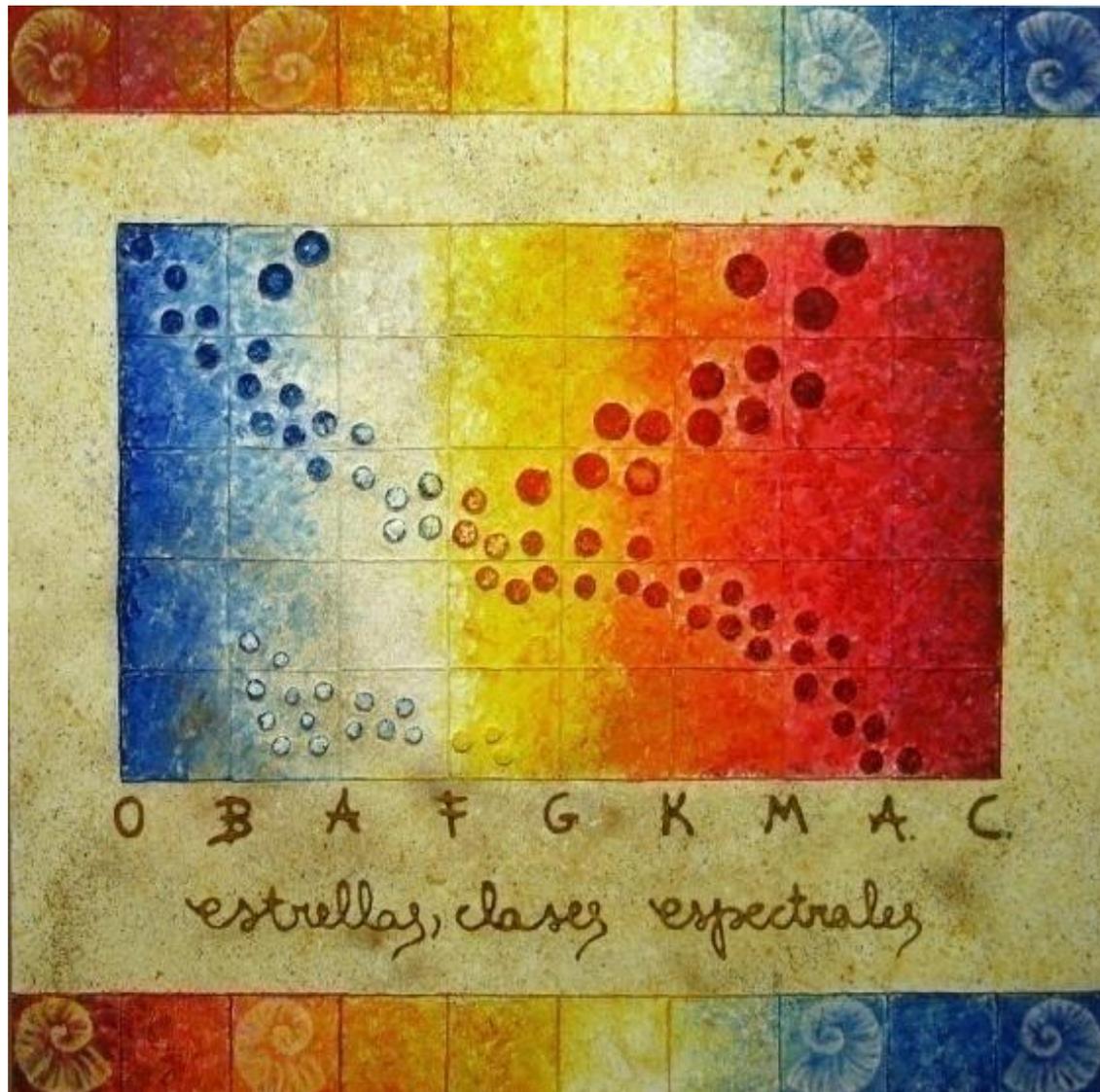
Annie Cannon developed a system of **classification of stars through spectral types** following the sequence OBAFGKM that was adopted as a standard in the 1910 meeting of the International Astronomic Union.



Classification of stars through spectral types



ANNIE CANNON. Stars, spectral types



ANNIE CANNON. Stars, spectral types

1X1m, mixed technique on canvas



EMMY NOETHER. Mathematician. Germany (1882-1935)

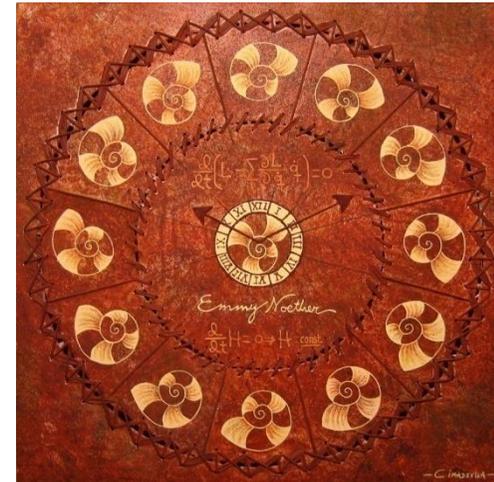
Although her fundamental field of study was algebra, she also worked on relativity. Her genius was recognized by the mathematical community of her time and her talent was praised, but she never received a decent wage and a great part of her work appeared in publications of her male colleagues and pupils.

If when acting upon a system, this system does not change, it is said to have symmetry. Noether's theorem proves that every symmetry in Physics implies a law of conservation. It was fundamental for the development of modern Physics.

Particular case of Noether's theorem

$$\frac{d}{dt} \left(L - \sum_{j=1}^n \frac{\partial L}{\partial \dot{q}_j} \dot{q}_j \right) = 0 \Rightarrow \frac{d}{dt} H = 0$$

The homogeneity in time, time passes and nothing changes: it involves the theorem of conservation of energy



EMMY NOETHER. Noether's theorem



EMMY NOETHER. Noether's theorem

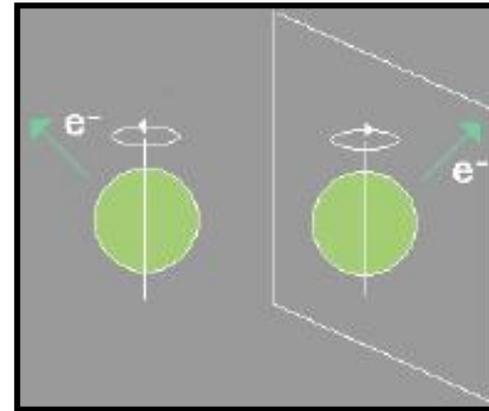
1X1m, mixed technique on canvas



CHIEN-SHIUNG WU. Physicist. USA (1912-1997)

In 1957, Chien-Shiung Wu **proved experimentally that nature discerns between right and left** (no conservation of parity). In spite of the fact that she was the one to prove it, only the scientists who put forward the theory were awarded the Nobel Prize in 1957.

The experiment of Wu. When an atom of cobalt, at very low temperatures, is exposed to a magnetic field, it emits an electron either in the direction the atom turns or in the opposite direction. Wu proved the priority of the emission of the electron in the opposite direction to the turning and that both possibilities did not happen at 50% as it was believed up to then.



Conservation of parity



CHIEN-SHIUNG WU. No conservation of parity



CHIEN-SHIUNG WU. No conservation of parity

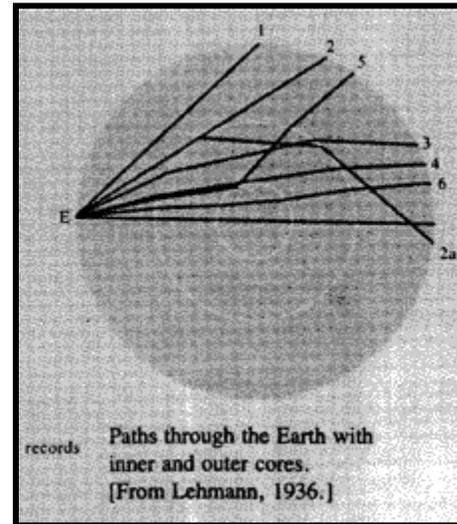
1X1m, mixed technique on canvas



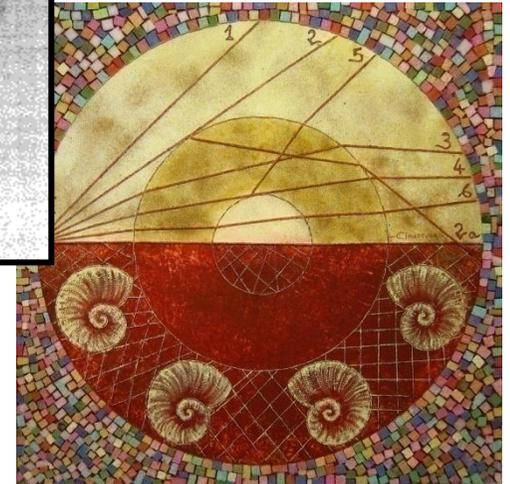
INGE LEHMANN. Seismologist. Denmark (1888-1993)

In 1936 she discovered the existence of the inner core and in 1945 the area of separation between the solid and liquid core called **discontinuity of Lehmann**. She was a pioneer scientist and a recognized seismologist.

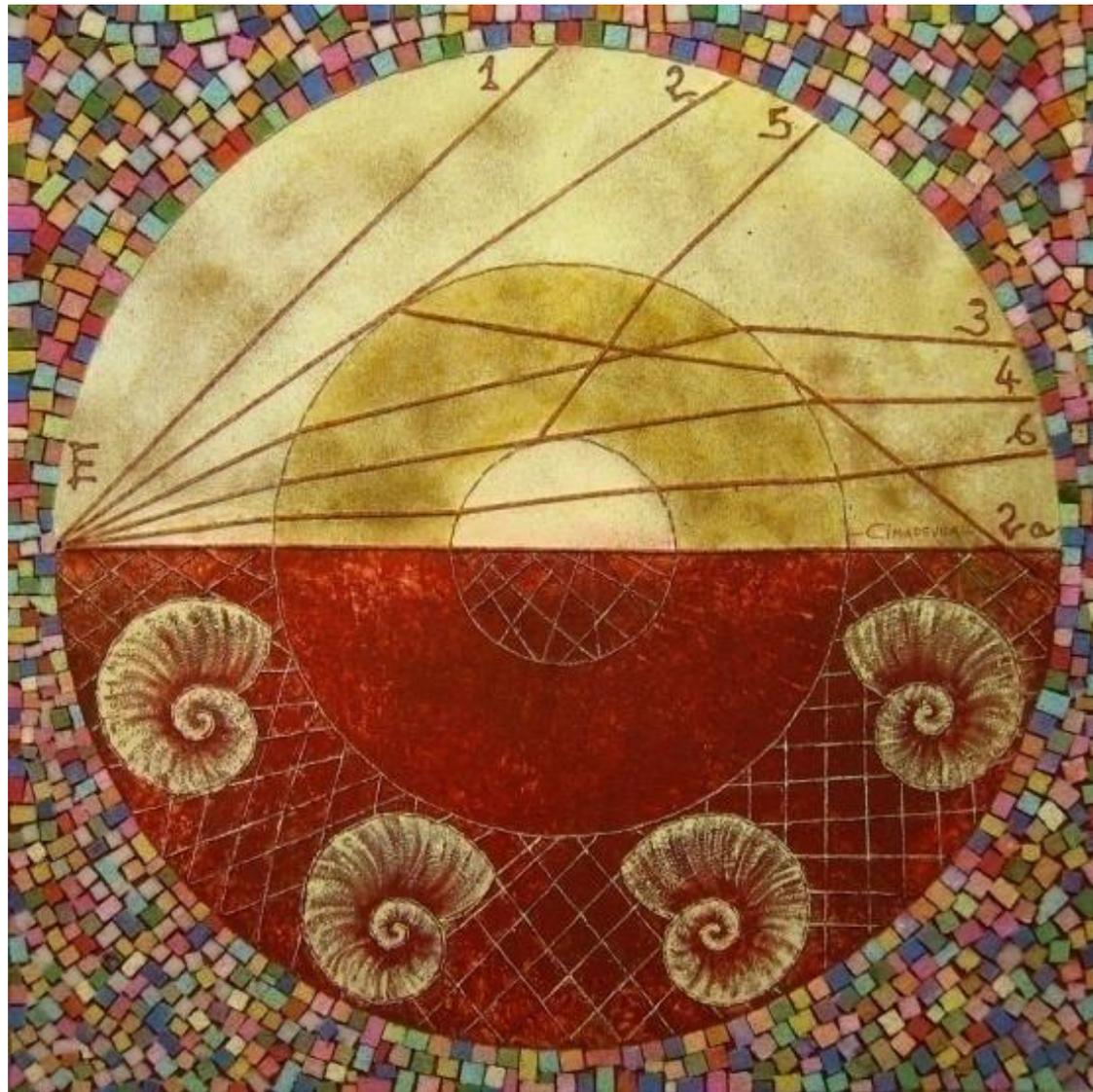
The inner part of our planet is formed by a liquid core which has inside a solid part called **inner core of the Earth**.



The deviation of P waves inside the Earth revealed the existence of a rigid inner core within the liquid core



INGE LEHMANN. Inner core of the Earth



INGE LEHMANN. Inner core of the Earth

1X1m, mixed technique on canvas

Objectives

- **Artistic:** showing the relationship between Science and Art
- **Spreading:** disseminating the world of Science, especially from CERN
- **Didactic:** creating useful graphic material for teaching

and, of course,

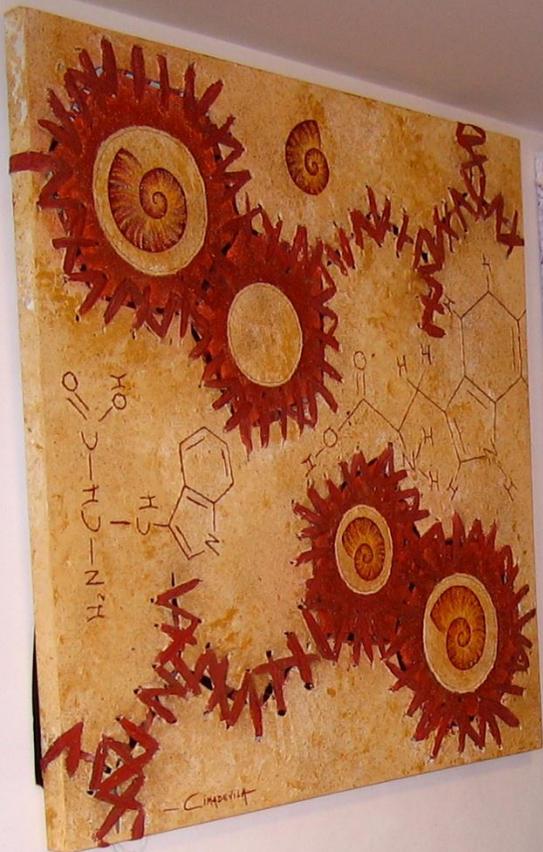
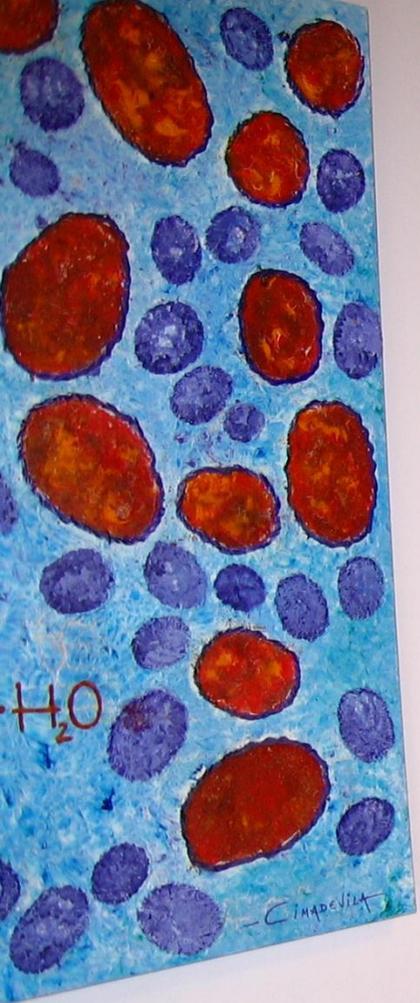
to emphasize the role of women in Science and in life.

AVANT-GARDE IN SCIENCE



Avant-garde in Science pays homage to the courage of men:

- ▣ who raised themselves above the small-mindedness by incorporating women into the world of Science
- ▣ like Hilbert, Rutherford, Severo Ochoa, Mittag-Leffler...



Information



Margarita Cimadevila

Nv. Travesía Buenavista 15, 8ºB

15006 A Coruña

Galicia, España

www.cimadevila.tk

+34 699 40 92 70

mcimadevila@hotmail.com