

Physics&Art against CO₂

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Universty of Udine, Isomorph srl

Opening session
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Science in the City, ESOF2020

31.7.2020

The use of fossil fuels

Is already creating big problems:

Global warming: fires in Australia, ice at pole melts, etc
polluted air: each year 7 million people die

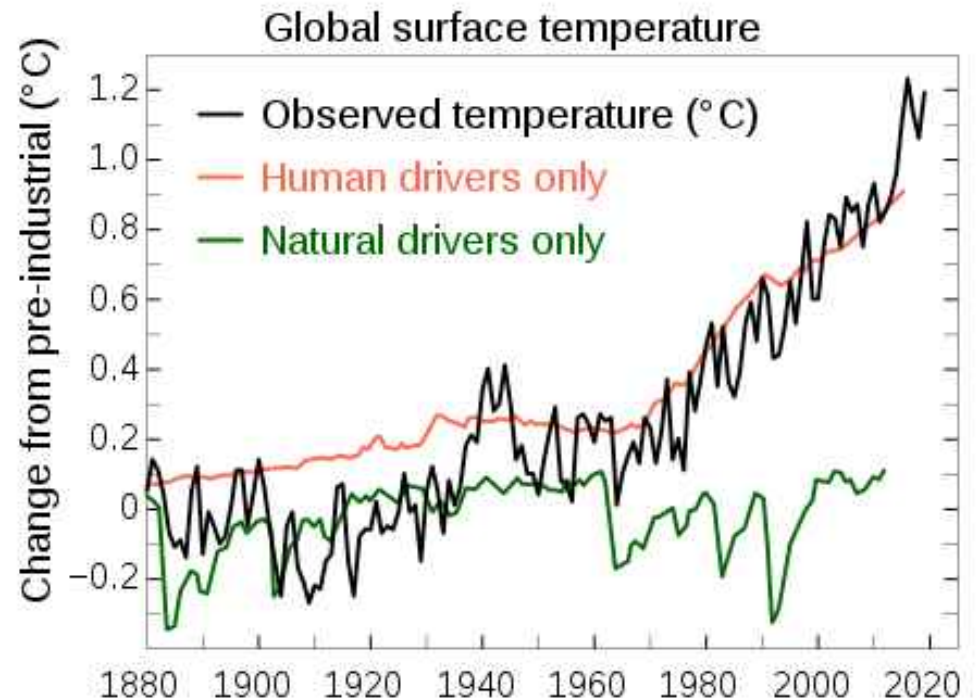
....
And it will become much worse

There are a lot of activities intended to stop CO₂:

International conferences (Paris)
Laws (decreto clima)
Lots of money is spent

....

Nothing helps, CO₂ continues to increase



It seems, that this time science cannot help us.

Has science come to its end?
If so, we are doomed.



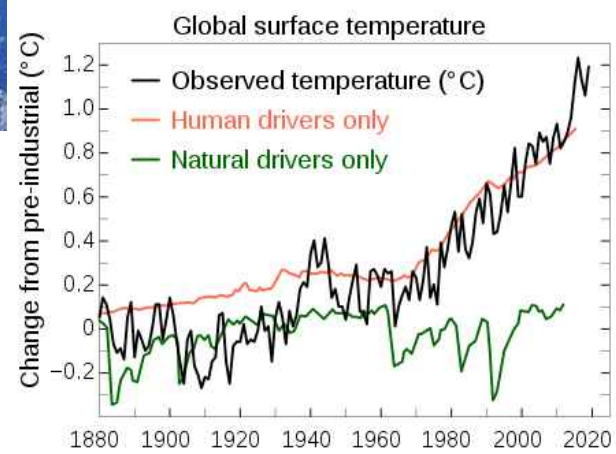
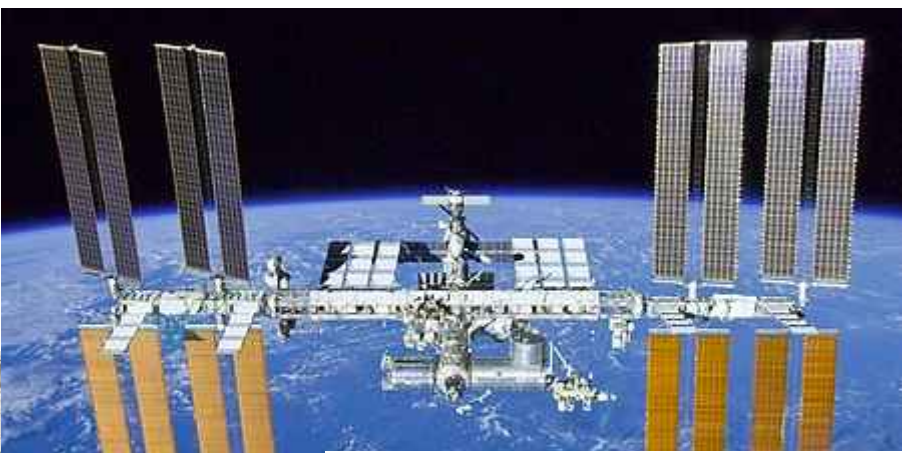
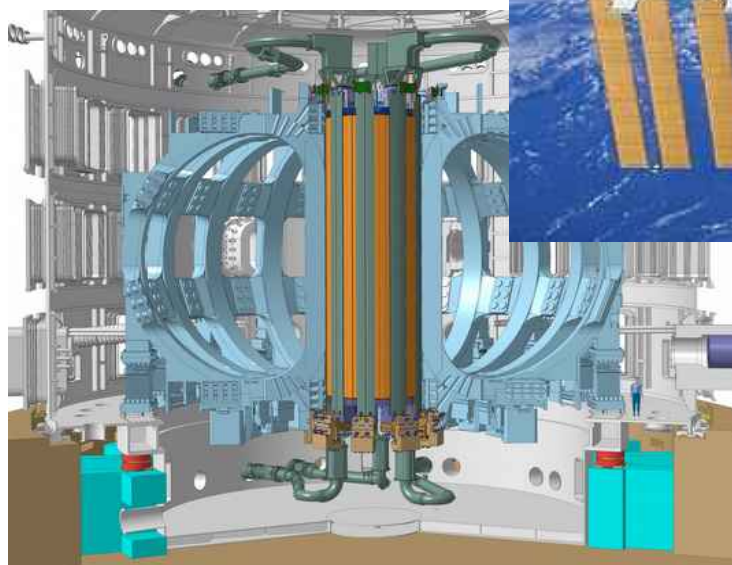
Or is there a problem in the way we are doing science? 2.5 billion \$

160 billion \$



2.67 billion €

20 billion €



I have been working in the big laboratories of organized science from 1975-1999
I obtained some very good results, but I also witnessed how physics is slowly substituted by administration and management.

I reported these things in a book, which shows how over-organized physics loses its creativity.

people talking only to themselves cannot do physics.
physics must communicate with the rest of culture, with real life, with industry and with art.



=> **physics experiment:**

Create an accademic spin off company (Isomorph srl)

Where physics can develop in contact with **culture and art**,

Where physics happens **here and now** (FVG), free of bureaucracy

Where our students can work **here** (instead of leaving Italy)

=> **experimental results:**

The Linear Mirror

experimental results

Very simple, reliable and economic



The supporting structure does not move
The heat exchanger is in a fixed position

Grassmann, H., et al. (2013) First Measurements with a Linear Mirror Device of Second Generation. Smart Grid and Renewable Energy, 4, 253-258.

1 unit substitutes 1000 l of heating oil per year
Certified with Solar Keymark

www.isomorph-production.it

The Linear Mirror is not a machine doing mechanical work (like turbine)

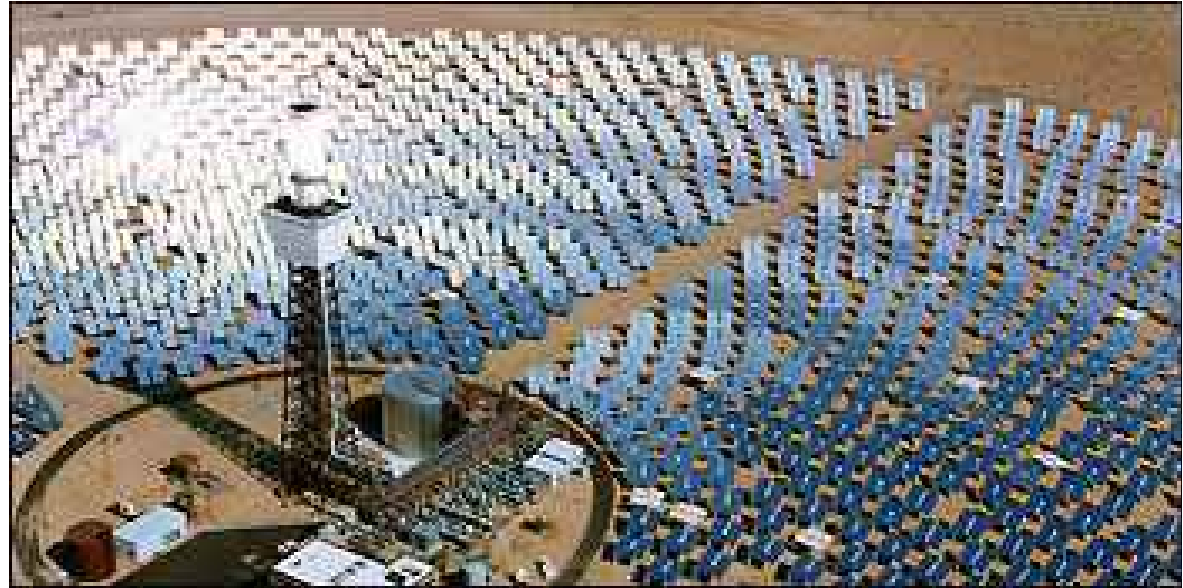
But an information processing system: input=time, output=mirror position

The closest state of the art
Is the heliostat field

It is based on the current
paradigma of information
theory (*), where for each
mirror two different calculations
must be performed in order to
follow the sun and since

these algorithmic calculations are all different from each other, each
mirror needs to have two motors

In this paradigma, the Linear Mirror (concentration factor of 20) would
need 40 motors for its operation.



(*) Shannon, Turing, Von Neumann, Apple, Microsoft, Intel etc

The Linear Mirror does not have 40, but only 2 motors.
 It is based on a fundamental physics theory of information (contemporary physics) No bits



Camera stenopeica, lavori nello spazio di colore di H.Grassmann, Luigi Tolotti

$$\{C\} \equiv \{C_1\} + \{C_2\} \equiv \begin{pmatrix} R_1 + R_2 \\ G_1 + G_2 \\ B_1 + B_2 \end{pmatrix}$$

Annamaria Castellan: zero pixel photography



With 40 motors,
the Linear Mirror would be
5 times as expensive

Also: innovative solar-air heat exchanger (spatial selective instead of wave length selective)
which provides hot air up to 200°C very efficiently

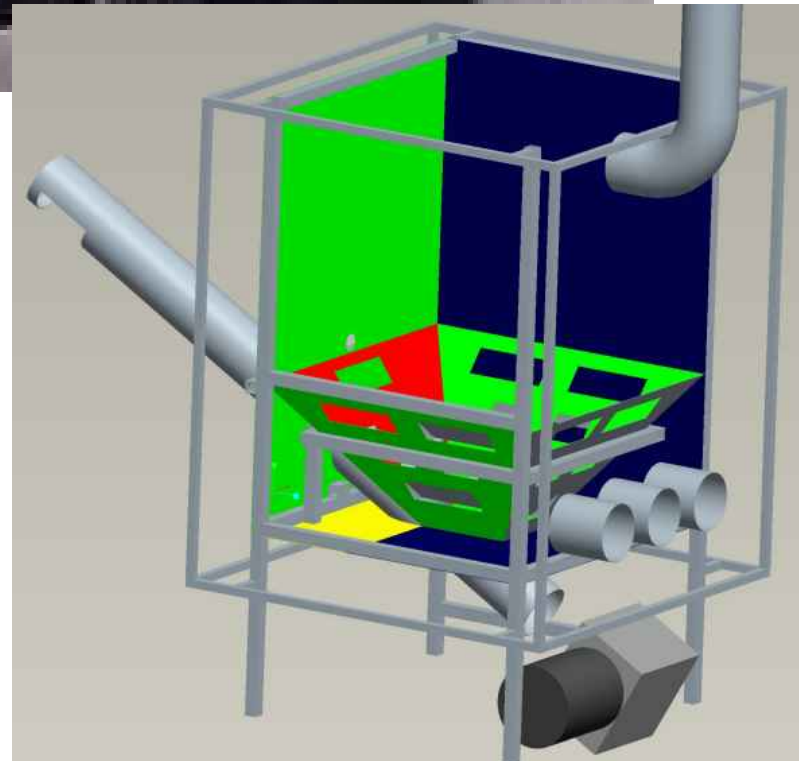


H.Grassmann, M.Citossi, Development and Test of a New Solar-Air Heat Exchanger for the Linear Mirror II System Smart Grid and Renewable Energy, 2019, 10, 155-164



hot air is used to roast waste biomass

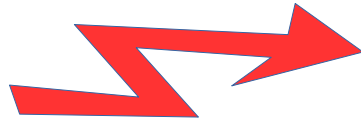
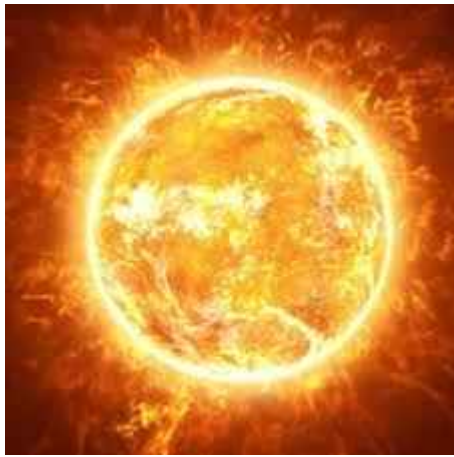
toaster



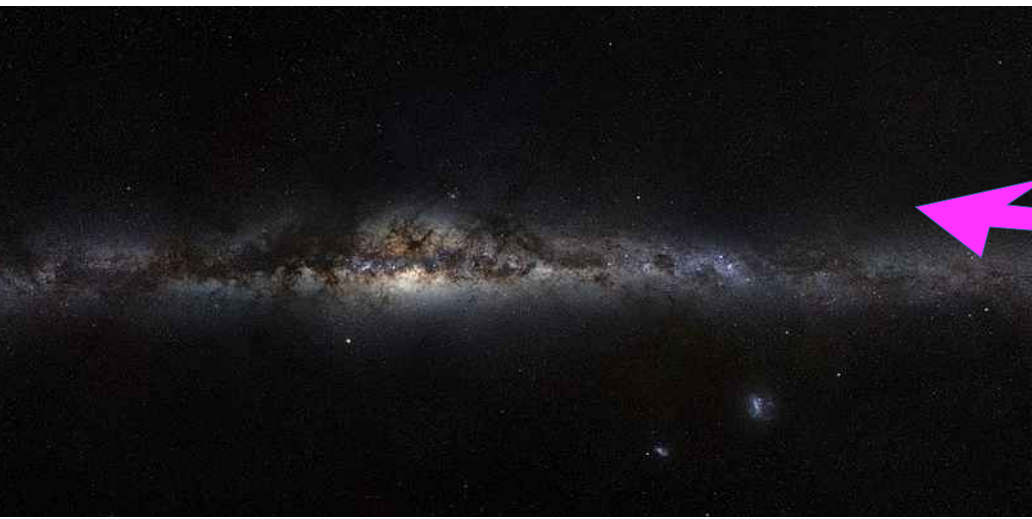
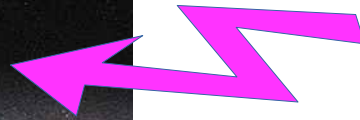
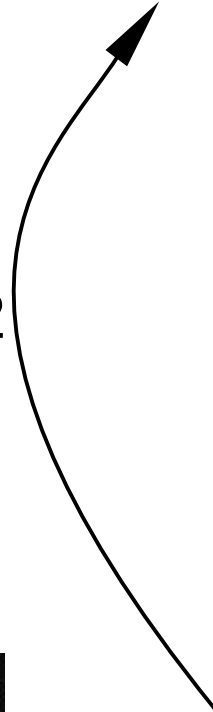
gasifier

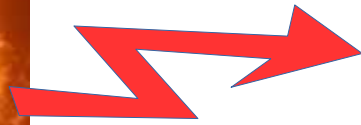
experimental results



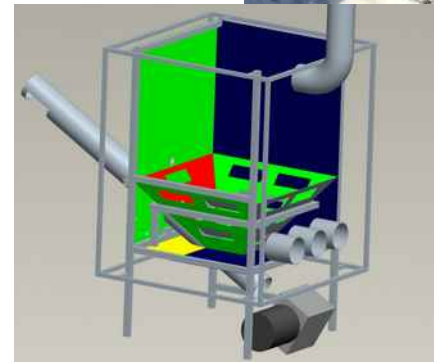
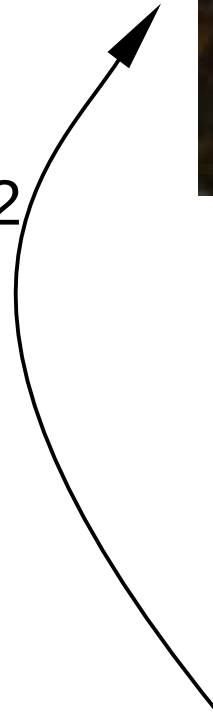


CO₂





CO₂



Keeping physics in contact with the rest of culture seems to work!



However, there was still a problem:

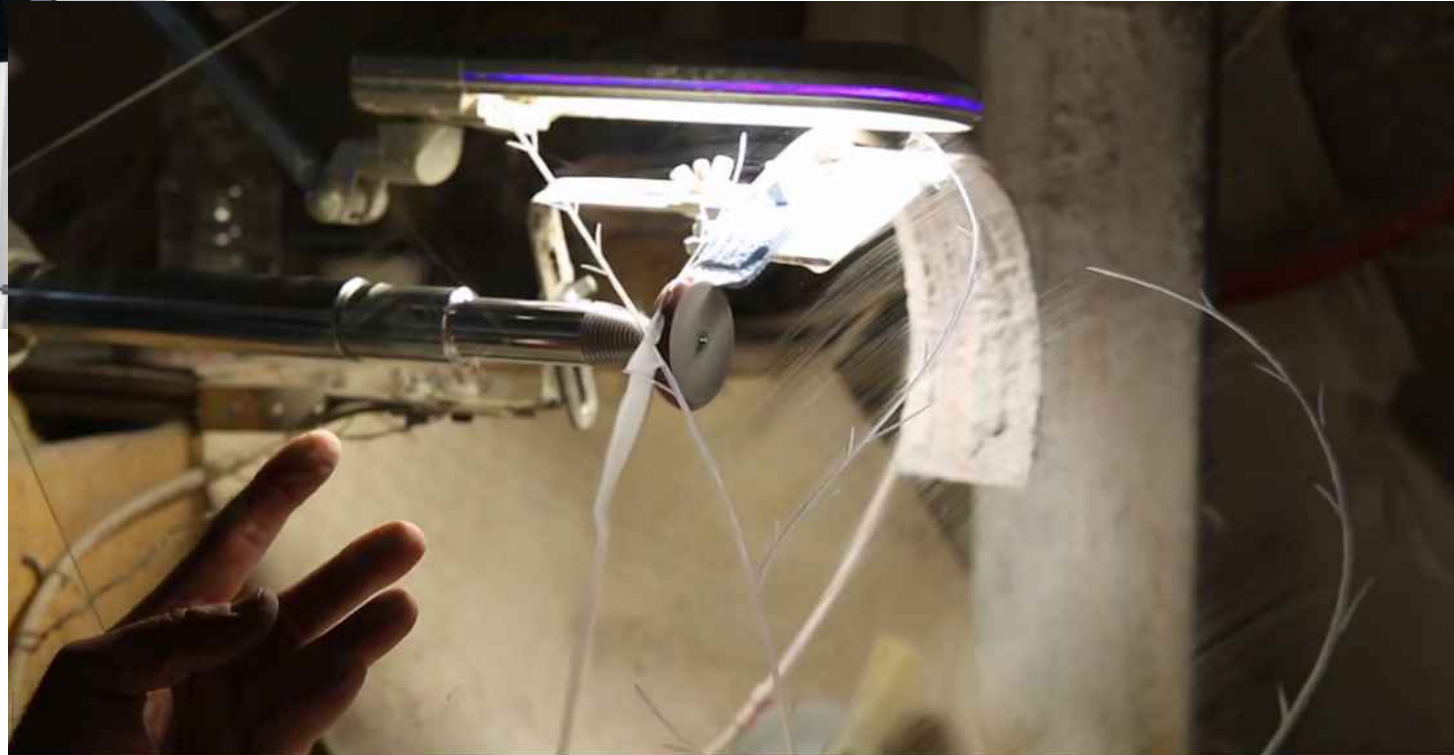
our group of artists and physicist was successful, yes, but still separated from the rest of society, “talking to itself”

Hans. Grassmann
Marina Cobal
Marco Citossi

Annamaria Castellan
Luigi Tolotti
Elena Mazzi
Fabiola Faidiga

So we had wonderful technologies to offer, which would allow to stop CO₂, to create new industries, to create wealth, to make farmers happy etc

There was nobody to receive our message

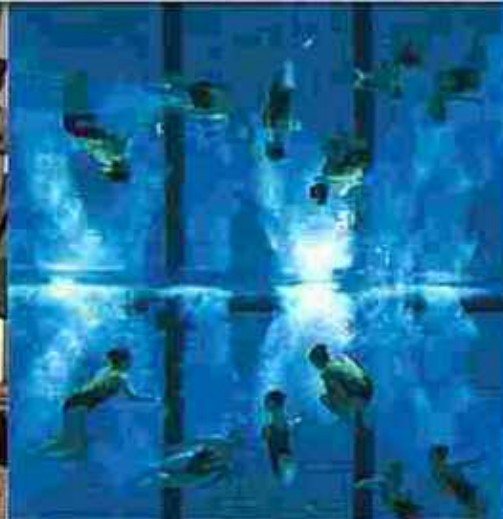
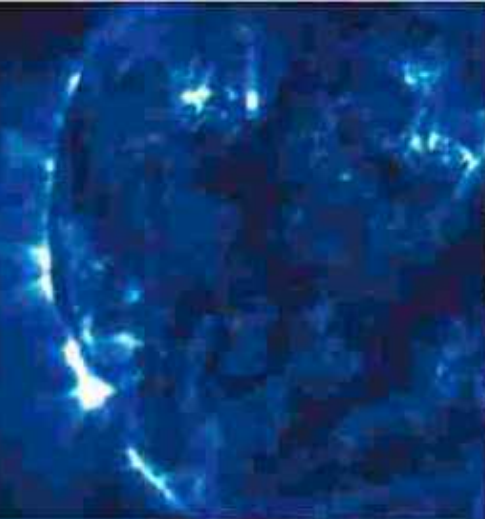


Lacuna – Land of
hidden spaces

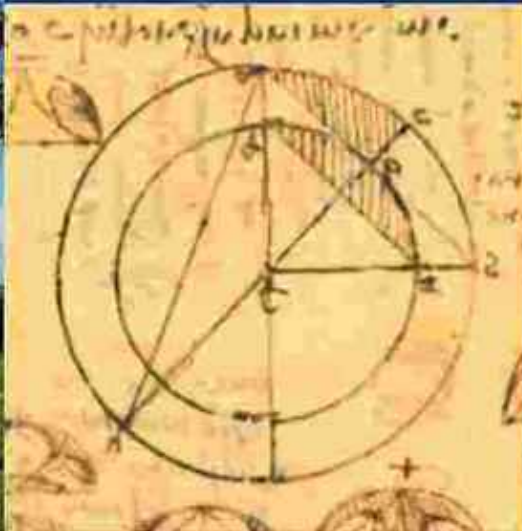
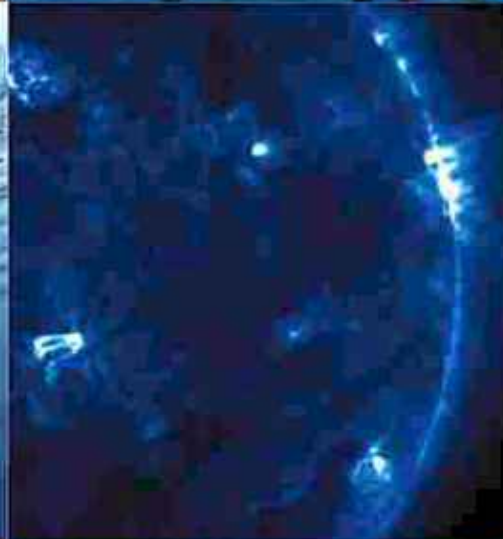
Elena Mazzi



Elena Mazzi "Reflecting Venice"



Contemporary
shower
Fabiola Faidiga





This is why we were so excited when ESOF came to Trieste!

ESOF is about connecting science, society, culture – just what we need
colleagues all over the world shared our excitement when they heard
about our ESOF project!

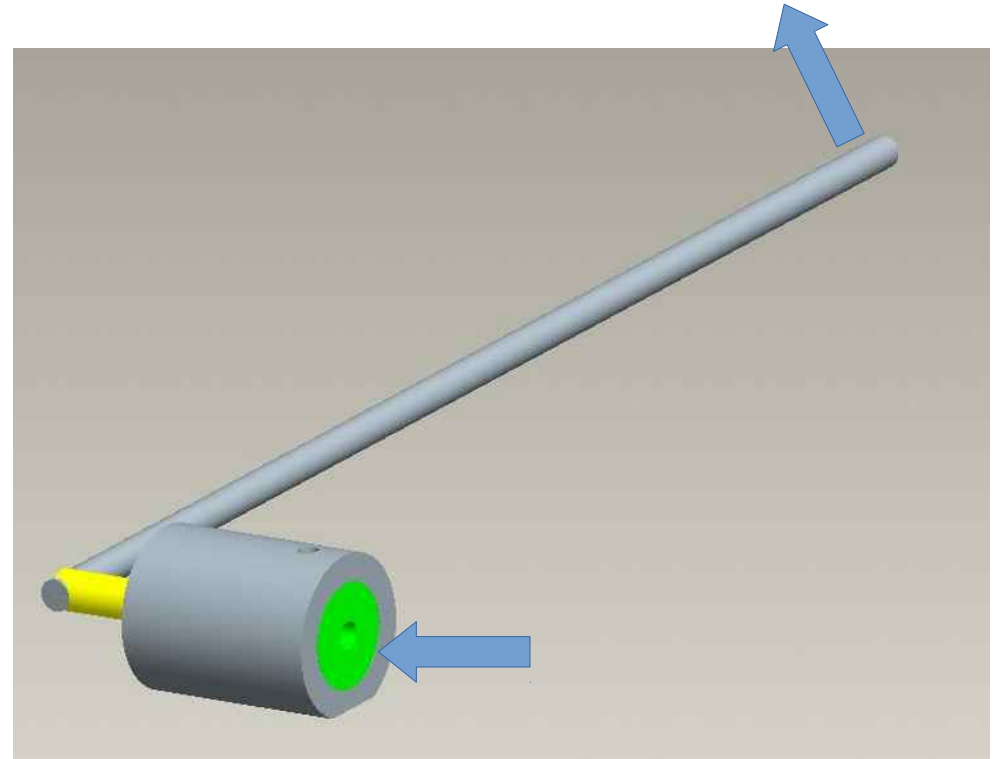
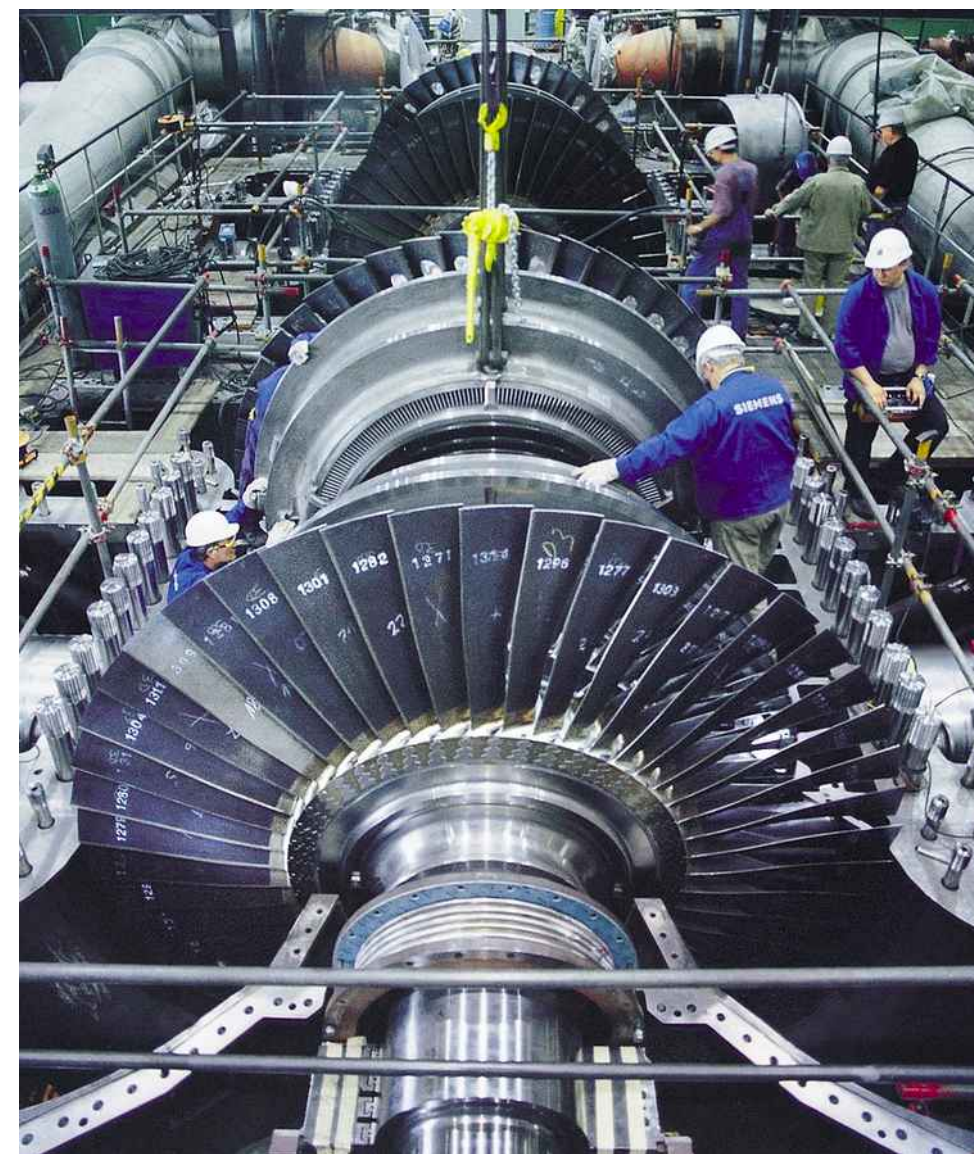
Beginning in May, a group of physicists formed

Fairouz Malek
Ketevi Assamagan
Diouma Kobor
Daniel Egbe
Joseph Diatta
Serigne Thiao

From France, USA, Germany, Senegal

experimental results

Since the Linear Mirror by now is boring from a physics point of view.
We choose a new and very difficult problem: the eolipile problem.



Renewable energy must be decentralized. Conventional turbines cannot be small
Siemens and GE are laying off thousands of workers.
Their jobs could be newly created at Trieste in eolipile production

εἰς κοῖλον σφαιρίον ἐνηρμοσθῶ τὸ ΘΚ· τῷ δὲ ἄκρῳ
τῷ Η κατὰ διάμετρον ἴστω κνώδαξ ὁ ΑΜ βεβηκώς
ἐπὶ τοῦ ΓΔ

πώματος, ἡ
δὲ σφαῖρα
ἐχέτω δύο
σωληνάκια
ἐπικυρπῆ
κατὰ διάμε-
τρον συντε-
τημένα ἀν-
τι καὶ ἐπι-
κυρμμένα
ἐναλλὰξ, αἱ
δὲ καρπαὶ
ἴστωσαν
πρὸς ὁρθὰς
ἐπιννοόμε-
ναι καὶ διὰ
τῶν Η, Α
εὐθειῶν.

συμβήσεται

οὖν θερμαινόμενον τοῦ λέβητος τὴν ἀτμίδα διὰ τοῦ
ΕΖΗ εἰς τὴν σφαῖραν ἐμπίπτουσαν ἐκπίπτειν διὰ τῶν

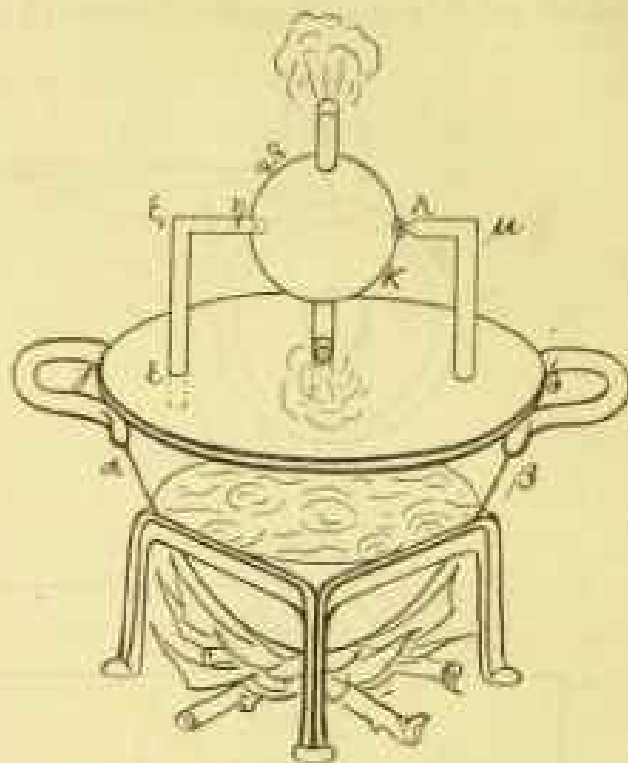


Fig. 55.

1—2 ἄκρῳ τῷ ΒΓΓ, Τζ ἄκρῳ τῷ ΑΓ, Ρ 19 καὶ Γ, Τ;
om. ΑΓ, 20 an ΗΖ, ΜΑ? 23—24 τοῦ εζη σωλήνος
Par. 2512, Voas 19

1 σφαιρίον om. Ρ 2 τῷ Η, τὸ Θ· Ρ 18—21 ἐπιννοόμε-
ναι . . . εὐθειῶν om. bL

verdrängt die Luft daraus, welche durch das Mundstück
entweicht und den Trompetenton hervorbringt.

XI.

Über einem geheizten Kessel soll eine Kugel sich
um einen Zapfen bewegen.

Es sei αβ (Fig. 55) ein mit Wasser gefüllter,
geheizter Kessel. Seine Mündung sei mit dem Deckel γδ

verschlossen; durch
diesen sei eine ge-
bogene Röhre εζη ge-
trieben, deren Ende²⁾
luftdicht in eine Hohl-
kugel Θκ eingepaßt
sei. Dem Ende η
liege ein auf dem
Deckel γδ feststehen-
der Zapfen ιμ dia-
metral gegenüber.
Die Kugel sei mit
zwei gebogenen, ein-
ander diametral ge-
genüber stehenden



Fig. 55a.

Röhrchen versehen, die in sie münden und nach entgegen-
gesetzten Richtungen gebogen sind (Fig. 55a). Die Bie-
gungen muß man sich rechtwinklig und quer durch die
Linien η und λ³⁾ denken. Wird nun der Kessel geheizt,
so ist die Folge, daß der Dampf durch εζη in die Kugel
dringt, durch die umgebogenen Röhren nach dem Deckel

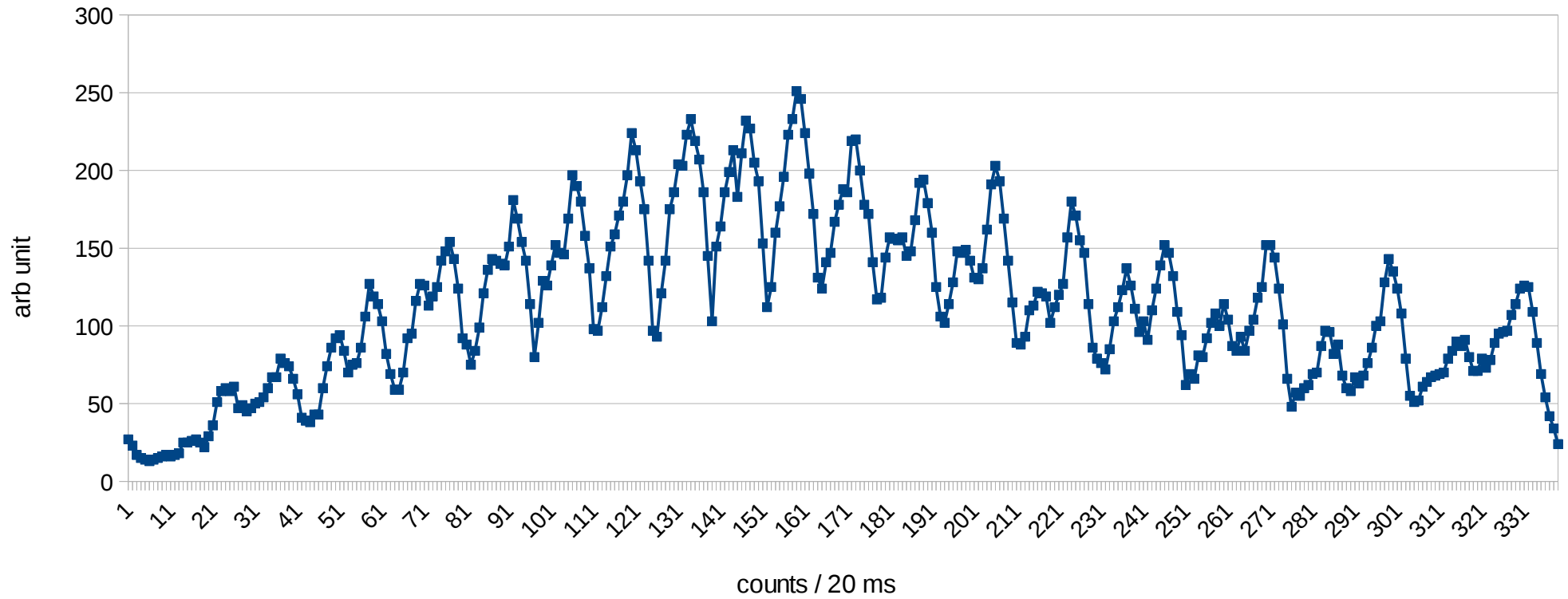
1) Fig. 55b ist handschriftliche Figur und steht in den
Prolegomena.

2) Zusatz in b: 'deren Ende η'.

3) Ungenau statt 'ζη und λρ'. In b fehlen die Worte 'und
quer dem . . . unter unten die Worte 'nach
s 'ähnlich . . . Figuren' aus-

P. Bussotti,
R. Otranto

voltage produced by motor



We next need to create as much **collaborations** as possible with **industry**

and create lines of communication with politics

After this presentation, please do not go away!

Tell us, what we can do for you, together with you

In order to create new industries, free of fossil fuels

An advantage for Italy

If what we have said in this presentation is true

If new relevant technologies must be part of a cultural and artistic Renaissance, than Italy is the ideal place for this new kind of technology,

Since Italy has an old and important culture,
which would be an ideal habitat for this kind of new technology

giving Italy a unique advantage in international competition.

Conclusion

The wonderful experience of ESOF2020 shows, that the alliance between physics and art and culture is not just an academic discussion

but is of real relevance, producing excellent results.

Join us now, so that we can start a development

which will continue also after ESOF

To create a better society and new industries in harmony with nature and the human being and free of fossil fuels.

We can do it here and now.