PROCEEDINGS OF SCIENCE

Palermo Workshop 2023: Concluding Address

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Before officially concluding this workshop (and it is far beyond my powers to attempt some concluding remarks beyond those already dealt with on the various burning questions presented by Paul Mason, Ataru Tanikawa, Michael Shara, and Rosa Poggiani, I would like to comment on a few highlights coming from our fruitful week of discussions about *The Golden Age of Cataclysmic Variables and Related Objects - VI*, without any pretension of completeness.

The Golden Age of Cataclysmic Variables and Related Objects - VI (GOLDEN2023)
4-9 September 2023
Palermo - (Mondello), Italy

*Speaker

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1. My Personal Comments

During this workshop we have discussed about those experimental tools that have provided a huge amount of data useful for improving our knowledge of the physics governing our Universe. These data are coming from big and small experiments ground– and space–based. Thanks to these experiments we have collected a huge amount of experimental data, the use of which is extremely difficult. This greatly limits the possibility of reaching a synthesis. In contrast, this immense amount of data generates a production of thousands of scientific articles that only in a few cases lead to a real advancement of knowledge.

From the many talks presented it appears, although often masked, a continuity between the infinitely small to infinitely big. And in this line we have discussed problems of:

- Opening Remarks: the Importance of Multifrequency Observations.
- Cataclysmic Variables (non-magnetic, intermediate polars, polars).
  - Fundamental parameters.
  - Accretion physics.
  - Outburst physics.
  - Magnetic phenomena.
  - Interconnection among classes.
  - Long term secular evolution.
  - The fate of CVs.
- Classical and Recurrent Novae.
- Nova-like Stars.
- Symbiotic stars.
- The Astrophysics of CVs and related Objects with the Ongoing and Future Space-Based and Ground-Based Experiments.

It is important to remark that undoubtedly the advent of space-based observatories has given a strong impulse to astronomy. Starting roughly from the early-to-mid-seventies and over almost all of the electromagnetic spectrum, these observations have continuously surveyed the sky. Figure 1 schematically shows this immense quantity of data coming from all bands of the electromagnetic spectrum, much more numerous than those acquired by optical telescopes since the beginning of their operation. The area shaded in red is roughly proportional to the total amount of data.

We know for sure that "*The Bridge between the Big Bang and Biology*" undoubtedly exists, as discussed in the book edited by Giovannelli (2001). The big problem is how to cross this bridge, and the main question is: *what are the experimental tools for understanding the pillars of this Bridge*?

In order to cross this bridge, as always when we cross a bridge, we must advance slowly, step by step, with continuity, because everything is smoothly linked in the *magma* of the Universe: from the infinitely small to infinitely big, a shown in Fig. 2 (Rees, 1988).

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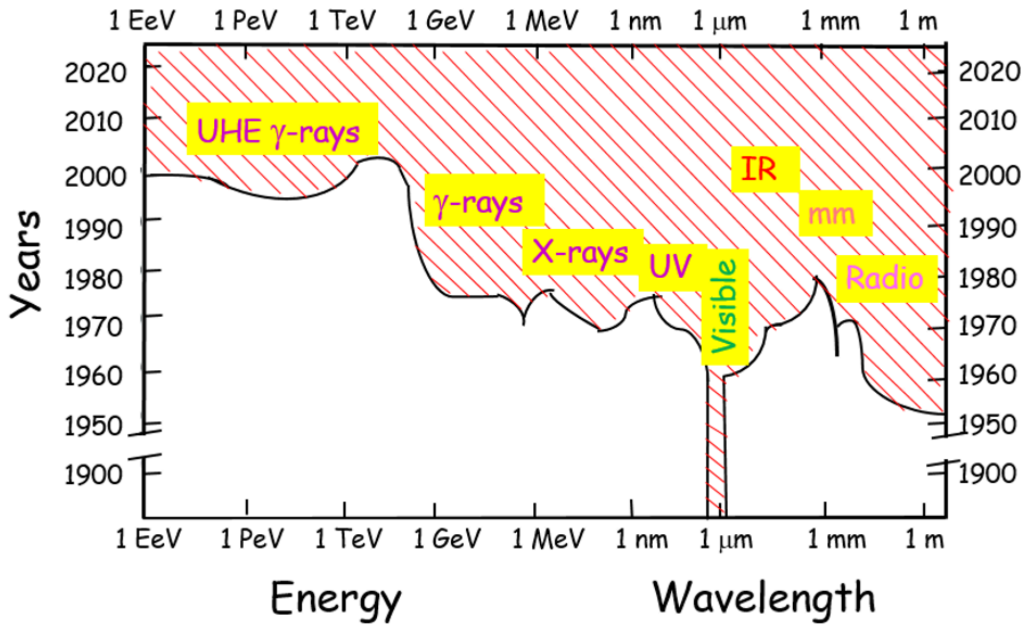

Figure 1: Schematic representation of the amount of data obtained along the electromagnetic spectrum since the beginning of space era (updated from Giovannelli & Sabau-Graziati (2004), after Lena (1988).

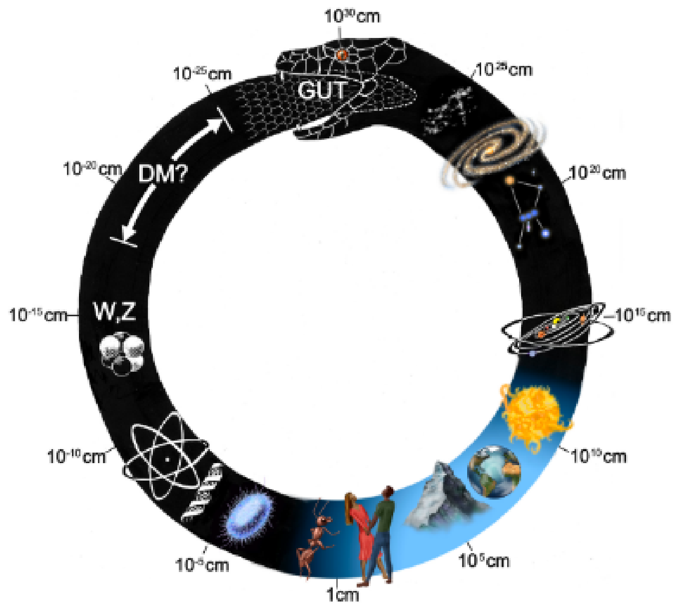

Figure 2: From the infinitely small to infinitely big (adopted from Rees, 1988).

In a more extensive way, the link between different components of the Universe is reported: Fig. 3 (Upper left) a metabolic network of a "simple" bacterium where each point is connected to any other point through the complexity of the network (Capra & Luisi, 2014). Fig. 3 (Upper right) shows the cosmic network (Credit: Andrew Pontzen/Fabio Governato, 2014; see also in (https://it.wikipedia.org/wiki/Cosmologia del plasma). Shandarin, Habib & Heitmann (2010) quantitatively specified the underlying mechanisms that drive the formation of the cosmic network. Fig. 3 (Lower left and right) shows the human body network and the human society network, respectively (Capra & Luisi, 2014).

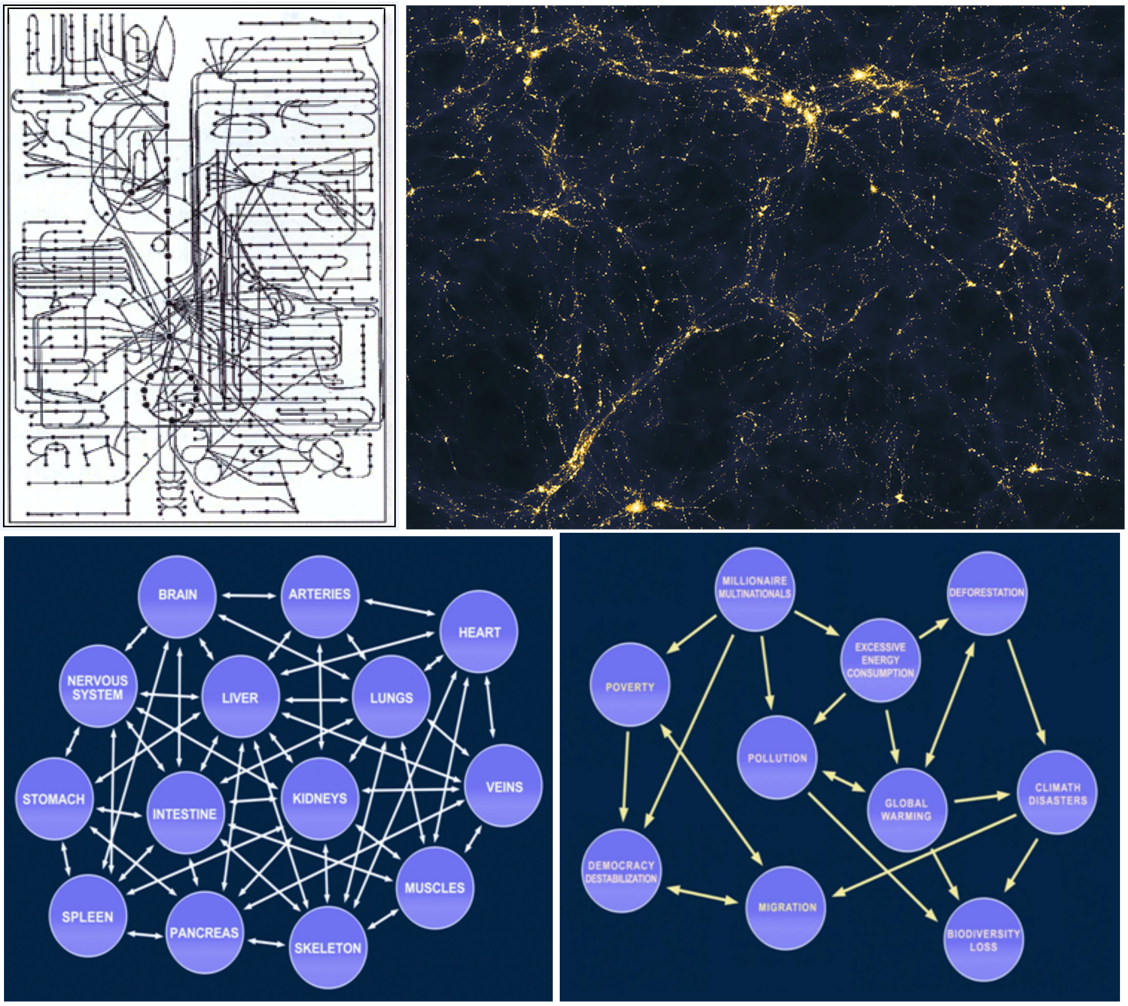

Figure 3: Upper left panel: Section of the metabolic network of a "simple" bacterium (Capra & Luisi, 2014). Upper right panel: the "cosmic network" (Credit: Andrew Pontzen/Fabio Governato, 2014) see also in (https://it.wikipedia.org/wiki/Cosmologia del plasma). Lower left panel: the human body network. Lower right panel: the human society network (Capra & Luisi, 2014). Adopted from Giovannelli, 2023.

Noting that all the components of the Universe are linked to each other in a more or less narrow, we try to find the glue that holds them together seamlessly.

Accretion is a universal phenomenon that takes place in the vast majority of astrophysical objects. The progress of ground-based and space-borne observational facilities has resulted in the

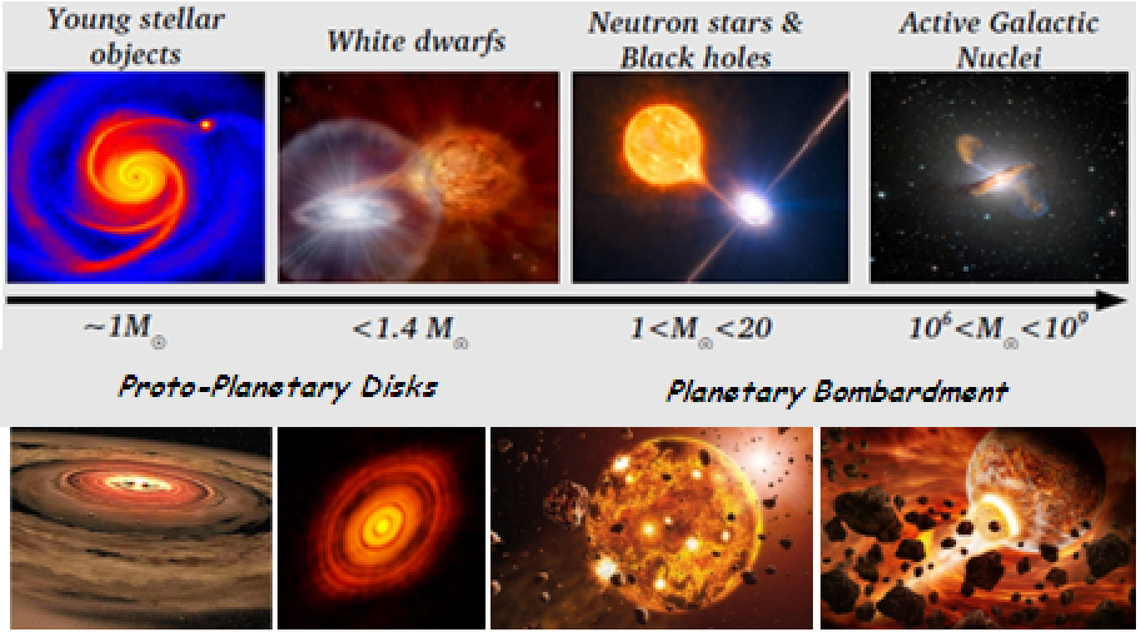

Figure 4: Accretion processes in different cosmic sources (adopted from Giovannelli & Sabau-Graziati, 2016, after Scaringi, 2015).

great amount of information on various accreting astrophysical objects, collected within the last decades. The accretion is accompanied by the process of extensive energy release that takes place on the surface of an accreting object and in various gaseous envelopes, accretion disk, jets and other elements of the flow pattern. The results of observations inspired the intensive development of accretion theory, which, in turn, enabled us to study unique properties of accreting objects and physical conditions in the surrounding environment. One of the most interesting outcomes of this intensive study is the fact that accretion processes are, in a sense, self-similar on various spatial scales from planetary systems to galaxies. Figure 4 shows a sketch of cosmic systems where accretion processes occur (Giovannelli & Sabau-Graziati, 2016, after Scaringi, 2015).

This fact gives us new opportunities to investigate objects that, by various reasons, are not available for direct study.

Cataclysmic variables (CVs) historically were the first systems that demonstrated the need for studies of the accretion disk processes around white dwarfs (WDs). In fact, these studies began in the early 1960's with the schools of Warsaw (Poland) and Cambridge (UK). However, CVs rapidly lost their primeval importance because of the advent of the first X-ray space experiments that, with their limited sensitivity, were mostly detecting X-ray binary systems (XRBs). These showed abundant X-ray emissions above the thresholds of their detectors. Of course, we now know that these sources emitted brightly thanks to the presence of neutron stars or black holes as companions of the optical low–mass or high–mass stars. The X-ray emission of CVs is about 2–3 orders of magnitude lower than that of XRBs. Thus the bulk of observations of CVs for a long time came from optical and UV regions, and sometimes from IR and occasionally from radio bands.

In the last decades, results coming from the new generation of satellites, especially in the hard X–ray and γ–ray regions, renewed the interest of scientific community on CVs.

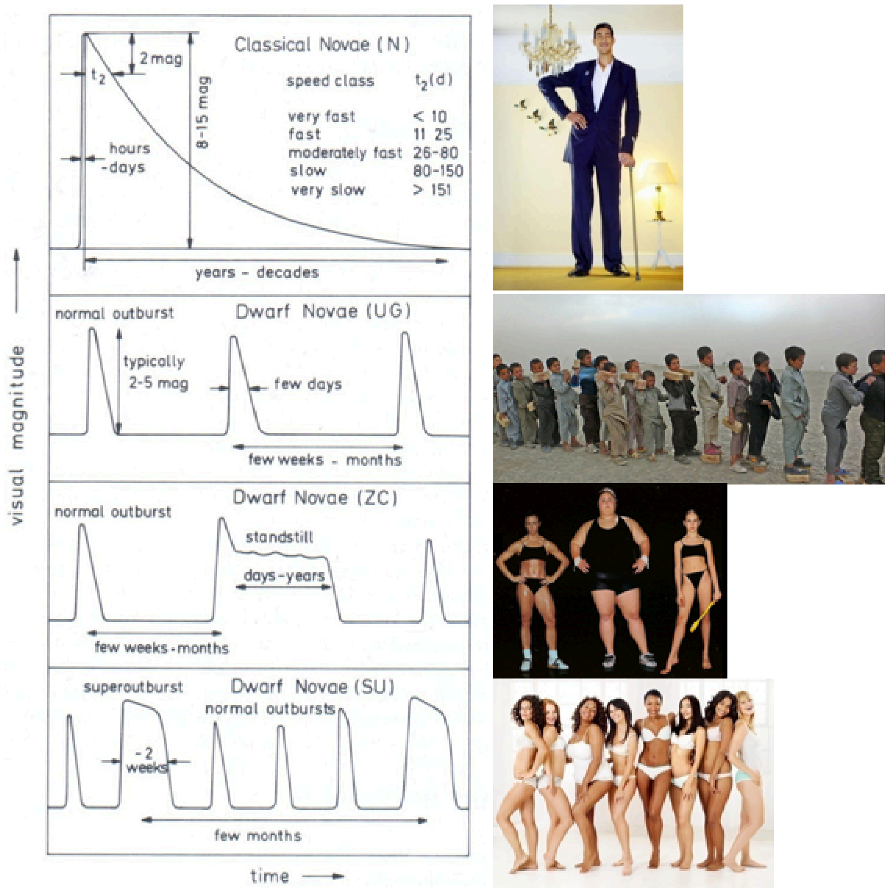

Figure 5: All the Cataclysmic Variables independent of the old classification types are Cataclysmic Variables (Ritter, 1992), as all the "Humans" independent of their forms are "Humans" (adopted from Giovannelli, 2017).

Indeed, among the cosmic systems where accretion processes occur, undoubtedly, non-magnetic CVs, intermediate polars and polars constitute the most powerful probe to test our theories of the various modes of accretion. The reason is rather simple: CVs are enough close to us and their processes develop in time-scales relatively easy to be followed and enough energetic to be easily detected. The long term evolution of CV systems accreting at a prohibitive rate has become a hot topic both in terms of the fate of such systems (all sorts of supernovae) and the microphysics of Eddington and super Eddington mass accretion and mass loss flows. In particular we stress one of the hottest topics in present day astrophysics, namely the progenitors of SN-Ia. This problem is connected with fundamental issues in cosmology. Novae and recurrent novae are the most promising progenitor candidates but so far could not be nailed down.

Following the old classification of CVs, in Fig. 5 it is possible to recognize "Classical Novae" (top panel), "Dwarf Novae" of the U Gem, Z Cam, and SU UMa types (lower three panels) (Ritter, 1992). They are all CVs independently of types, as the different humans depicted, which are of course "humans".

Therefore, it is necessary to find a method as general as possible to describe the behavior of cataclysmic variables. This can be obtained looking at the Accretion Behaviour and Magnetic Field.

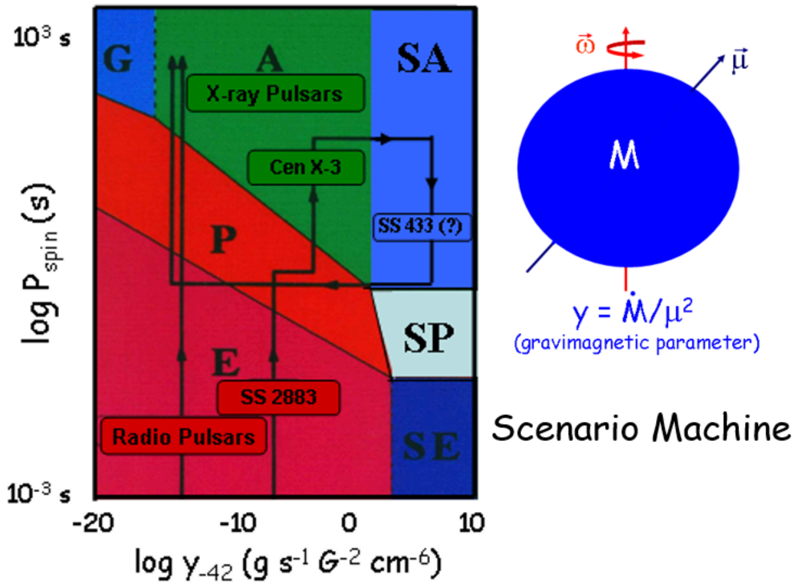

Figure 6: Distribution of magnetic rotators in the plane "Spin Period" – "Gravimagnetic Parameter" (adapted from Lipunov, 1995).

The nature in all its manifestations shows continuity, thus we have to abandon the "convenient method" of thinking everything in "Watertight Compartments" and to go toward a general model for compact accreting stars.

Such a general model called "Scenario Machine" was developed many years ago by Vladimir Lipunov and collaborators (Lipunov, 1982, 1987, 1991; Lipunov & Postnov, 1988; Lipunov, 1995) and updated by Lipunov, Grinshpun & Vlasenko (2021).

Each compact object is considered as a "gravimagnetic rotator", rotating with $\vec{\omega}$ velocity and with a magnetic moment $\vec{\mu}$, with the axises not necessarily coincident. Introducing a "gravimagnetic parameter" as y = $\dot{M}/\mu^2$, it was possible to construct a Period-Gravimagnetic parameter diagram log P_{spin} vs log y in which all the accreting sources lie, as shown in Fig. 6.

Figure 7 shows the updated Universal Period-Gravimagnetic Parameters diagram for most of the observed types of neutron stars and white dwarfs, Intermediate Polars, X-ray accreting pulsars, ULX pulsating sources, radiopulsars with standard magnetic field ($\sim 10^{12}$ G) on neutron staars, millisecond radiopulsars with low magnetic field ($\sim 10^{8-10}$ G) on neutron stars, and Magnetars ($> 10^{14}$ G) (adopted from Lipunov, Grinshpun & Vlasenko, 2021). In this Period-Gravimagnetic Parameter diagram is reported also the recent detected AR Sco as the first white dwarf-pulsar (Buckley et al. (2017).

2. Something wrong in science?

I would like to remind several observations that apparently could appeared obvious, but unfortunately they are not. Indeed, sometimes theoreticians are tempted to force their models fit to experimental data using too many free parameters. In this way it is possible to fit everything, but often the physics is violated. So, be careful: use very few free parameters with physical meaning.

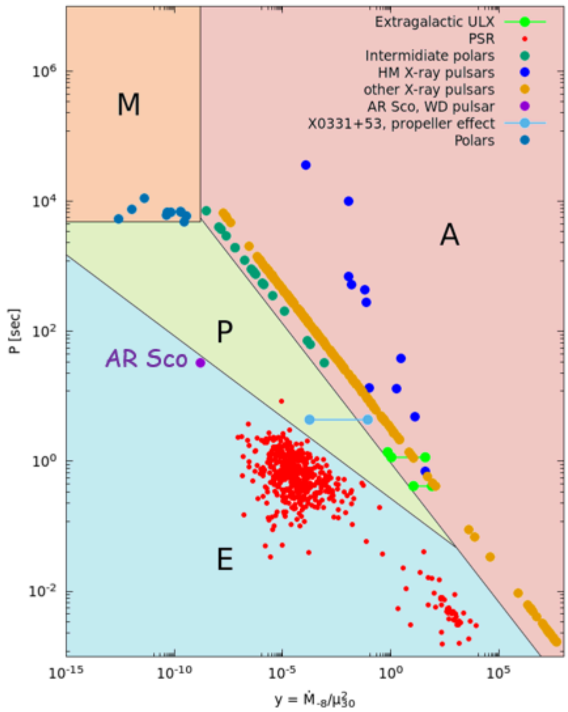

Figure 7: Universal period-gravimagnetic parameters diagram for most of the observed types of neutron stars and white dwarfs. Intermediate Polars are shown in green; X-ray accreting pulsars, are ochre; ULX pulsating sources are in light green; radiopulsars with standard magnetic field ($\sim 10^{12}$ G) on neutron stars are in red, millisecond radiopulsars with low magnetic field ($\sim 10^{8-10}$ G) on neutron stars are in green and Magnetars ($> 10^{14}$ G) are in magenta (adopted from Lipunov, Grinshpun & Vlasenko, 2021).

Woe to discover the umbrella . . . or hot water again! For instance, many publications in ApJ report the same results which had appeared many years before in Soviet Literature, and elsewhere.

Never confuse the effect with the cause. There is a general law in the Universe: Cause and Effect. The Cause generates an Effect and NOT vice versa!. X-ray and γ-ray emissions is produced because of accretion of matter onto (compact) cosmic sources. . . Accretion is a general process, as sketched in Fig. 4.

In my opinion, another critical point in evaluating a researcher's scientific career is linked to the number of publications. This causes a hunt to publish the greatest number of articles regardless of their real contribution to the advancement of knowledge.

And the value of an article is often linked to the number of citations in international literature. This unfortunately gives rise to a series of "friendly quotes".

In my opinion, these two evaluation methods should be drastically revised. In fact, today we are witnessing the presence of researchers who publish more than one hundred articles in a year. This often derives from the researcher's belonging to very large groups involved in large experiments. Common sense leads us to say that a reasonably good scientific paper takes at least about three months to complete. This results in a reasonable upper limit of articles per year of ~ 4. We can add some publications (say ~ 6) in international conference proceedings. Therefore the number of publications where the researcher is directly involved would be $\sim 10 \pm 3$/yr.

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Figure 8: This is the explosion of Supernova "Livio Gratton" who has expelled a number of "well-known" pupils. Surely each astrophysicist will know at least two of these “students” of Professor Livio Gratton.

Hence the contradiction of evaluating a researcher’s career by the number of publications.

In this regard I want to quote a phrase that my Astrophysics professor at the "La Sapienza" University of Rome always said: **favor the quality of the articles instead of the quantity**.

And this phrase came from the mouth of Professor Livio Gratton who with his far-sighted energy and knowledge, similar to the explosion of a supernova, generated a multitude of pupils (like supernova remnants) who became famous. Figure 8 schematically shows the "Livio Gratton Supernova" entering the world its first, second and third generation pupils of science. Certainly the reader of this article will know at least a couple of these students.

To gloss my previous statements on the situation of research in astrophysics, I want to present some graphs that depict, alas, the state of the art on the problem of community publications and the number of authors for each publication, as well as the number of citations of the published articles, referring to Paolo Padovani’s talk during the Frascati Workshop 2019.

Figure 9 shows the lower limit of the astronomy research population and the total papers produced over time (https://orbitingfrog.com/2012/08/04/authorship-in-astronomy/).

Starting from around the 1970s, the two curves, which had an almost parallel trend, began to diverge. The number of published works increases less than the number of the researcher population. This fact is highlighted by Fig. 10 where it is clearly seen that the number of publications for each member of the researcher population drops drastically, going from around 2-4 publications/year for each researcher until around the 1960s to approximately 0.3 publications/year, starting from the first decade of 2000.

Figure 11 shows the average and maximum number of authors for papers, per year, in astronomy. It is clear that the number of authors for each paper underwent a surge starting around the 1980s: this means that large collaborations began with a consequent increase in the number of collaborators. And this explains why many authors publish up to more than 100 articles per year.

Figure 12 shows the fraction of astronomical papers published with 1, 2, 3, 4 or more authors. Even from these curves it is clear that the era of individual works is waning in favor of those coming

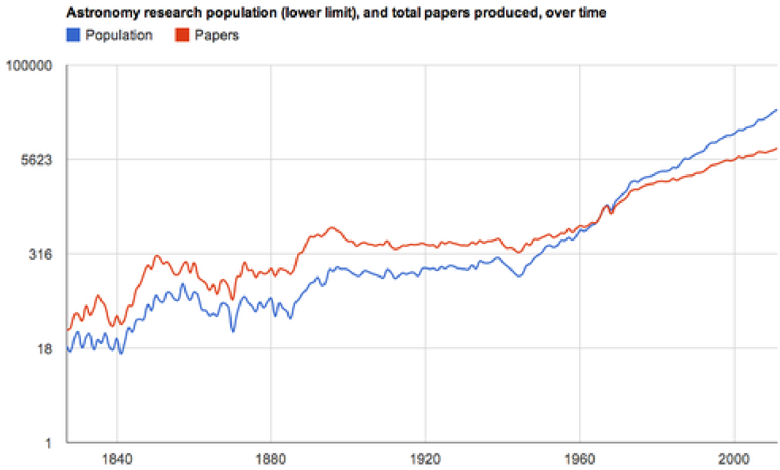

Figure 9: Lower limit of the astronomy research population (blue color) and the total papers produced over time (red color) (https://orbitingfrog.com/2012/08/04/authorship-in-astronomy/).

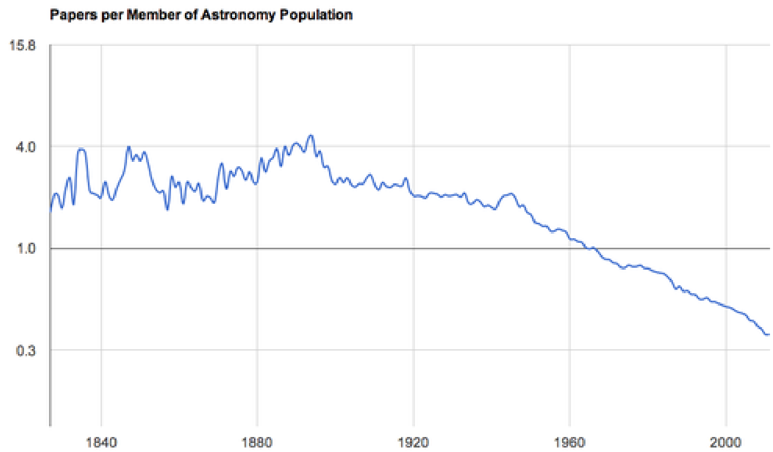

Figure 10: Number of yearly papers for each member of the astronomy research population (https://orbitingfrog.com/2012/08/04/authorship-in-astronomy/).

from collaborations involving more and more researchers. Consequently, the fraction of citations also follows the same trend, as shown in Fig. 13.

A very interesting PhD thesis by Dag Westreng Aksnes (2005) discuss *Citations and their use as indicators in science policy. Studies of validity and applicability issues with particular focus on highly cited papers*.

A publication is considered as highly cited if the number of citations received is more than a certain multiple of the mean citation rate of the particular subfield. In his PhD thesis, Aksnes reports a paper (Aksnes, 2003) in which two interesting diagrams analysing the scientific publications in Norway from 1981 to 1995 (see Fig. 14).

It is generally known that citations follow a typical pattern of rise and decline. An article is poorly cited the first year, reaches a citation peak a few years after publication and then shows a slowly decreasing pattern of citedness the following years. This pattern is clearly illustrated in the

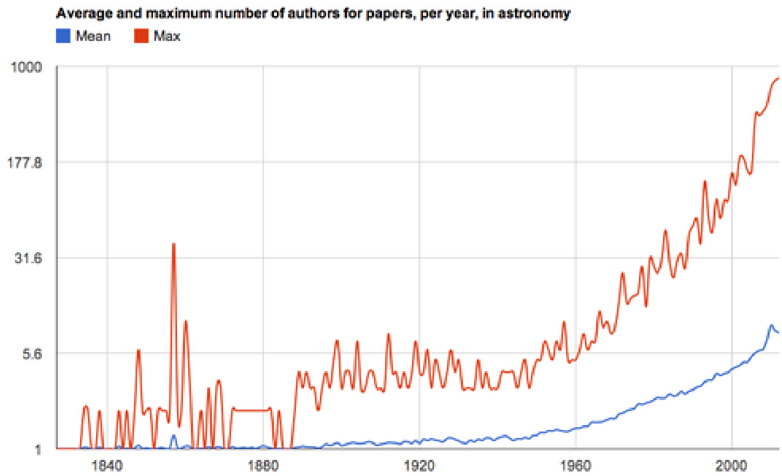

Figure 11: Average and maximum number of authors for papers, per year, in astronomy (https://orbitingfrog.com/2012/08/04/authorship-in-astronomy/).

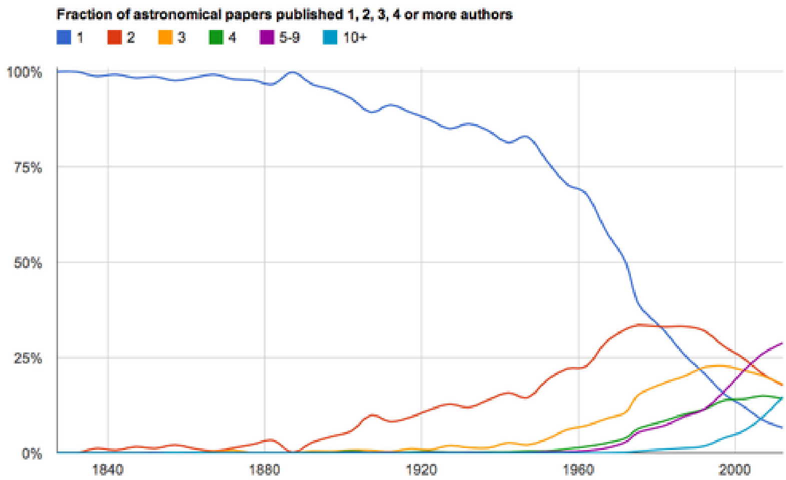

Figure 12: The fraction of astronomical papers published with 1, 2, 3, 4 or more authors (https://orbitingfrog.com/2012/08/04/authorship-in-astronomy/).

citation curve of the highly cited papers. On average these papers reach a top of 22 citations in the fourth and fifth years following publication (that is three to four and four to five years, respectively, after publication). In comparison, the average for all papers is a maximum of 1.78 citations at identical time periods. Calculated as the percentage of all citations received during the 15-year period, the highly cited papers do not differ much from the average. Both groups of papers receive a maximum of 12% of their citations during each of these peak years. Still, the highly cited papers age slightly more slowly and peak a bit later than the other papers, but the differences are only marginal (upper panel of Fig. 14).

As we can see from the lower panel of Fig. 14, two categories account for the large majority of the papers: One type of papers is characterised by a moderate period of initial increase followed by a gradual decline (medium rise – slow decline). The other type is characterised by a relatively slow

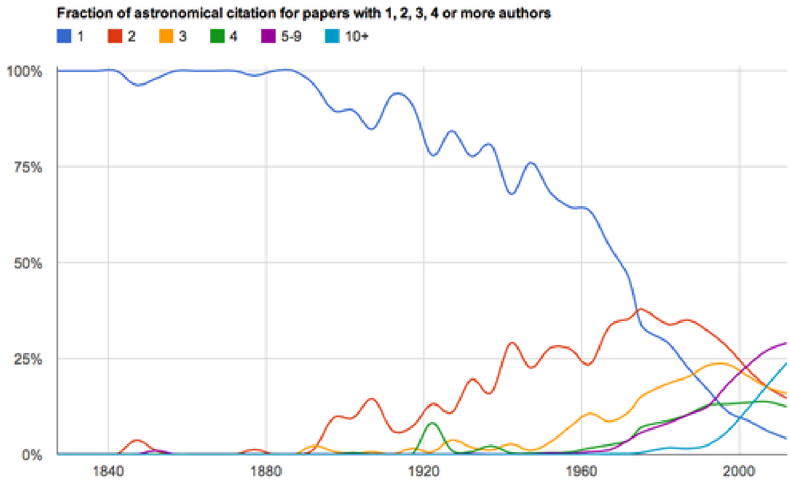

Figure 13: Fraction of astronomical citation for papers with 1,2,3,4 or more authors (https://orbitingfrog.com/2012/08/04/authorship-in-astronomy/).

rise, with a stable citation level thereafter (delayed rise – no decline). Also, the categories 'early rise – rapid decline' and 'medium rise – no decline' account for a significant share of the papers. The other categories are non-existent or marginal.

The results reported by Aksnes (2003) are substantially the same reported by Abt et al. (1981). However, this latter paper reports that 6.1%, or 20 papers, contained in their sample of 326 papers published in 1961 were never cited during the 18 years after publication.

Trimble & Ceja (2007) report that 3.3% of the papers in a sample of 7768 papers have never been cited after 4 years after the publication.

The result reported by Meho & Rogers (2008) is even worst: It is a sobering fact that some 90% of papers that have been published in academic journals are never cited. Indeed, as many as 50% of papers are never read by anyone other than their authors, referees and journal editors. And this is one more point in favour of the Professor Livio Gratton's phrase: **favor the quality of the articles instead of the quantity**.

3. The era of even bigger data

After this workshop it appears evident once more the importance of Multi-frequency Astrophysics. However, there are many problems in performing simultaneous multi-frequency, multi-sites, multi-instruments, multi-platform measurements due to:

- objective technological difficulties;
- sharing common scientific objectives;
- problems of scheduling and budgets;
- politic management of science.

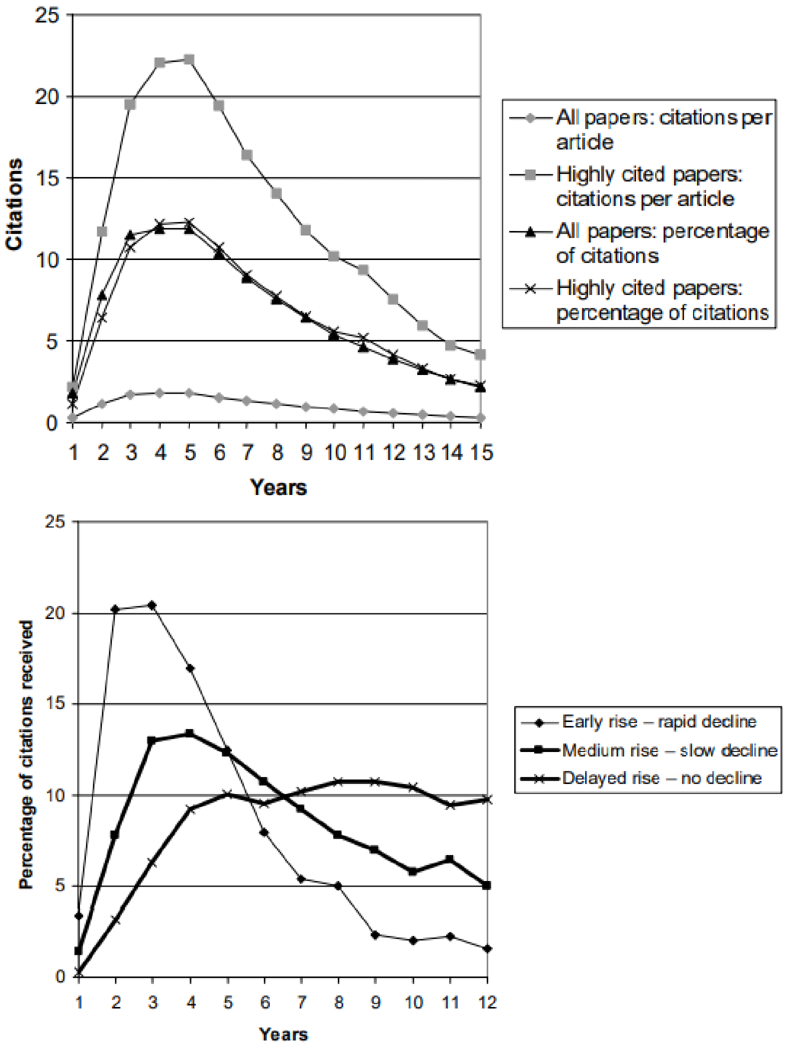

Figure 14: Upper panel: Citations* received vs. time following publication (* The citation counts have been scaled up according to year of publication. Lower panel: Citation curves for three different clusters of highly cited papers* (* Based on the 1981–1989 publications, and a 12-year citation window) (adopted from Aksnes, 2003).

Furthermore, with the advent of new experiments, such as those listed below (Padovani, 2019), the scientific community will be forced to manage an immense amount of data, such as those expected from SKA (Square Kilometer Array) which will be approximately 4.6 EB. Are we ready for handling these amount of data? How will it be possible to arrive at a synthesis?

- Radio band: ASKAP, MeerKAT, e-MERLIN, APERTIF, SKA
- IR band: JWST, Tokyo Acatama Observatory, Euclid, WFIRST, SPICA
- Optical/NIR bands: Zwicky Transient Facility, LSST, GMT, ELT, TMT
- X-ray band: eROSITA, IXPE, SVOM, eXTP, XIPE, Athena, Theseus, FORCE, XRISM, Colibrì

- γ-ray band: CTA, Large High Altitude Air Shower Observatory
- And more, including CubeSats

Among the problems in performing simultaneous multi-frequency, multi-sites, multi-instruments, multi-platform measurements, the *political management of science* is particularly important.

3.1 Political Management of Science

Far be it from me to accuse the entire scientific community of the sometimes very questionable choices regarding the methods of selecting experiments, especially space experiments where there are multiple interests at stake. However, I want to mention a couple that concern me personally and which, if they had been treated with greater attention, could have certainly brought important results for the advancement of knowledge of our Universe.

Way back in 1993, Giovannelli et al. (1993) published a short paper in which they proposed a payload for a small satellite, named SIXE (Spanish Italian X-ray Experiment). This is a multifrequency (X-ray and Optical) payload for Long Term continuous observations of few selected cosmic sources.

Later Giovannelli et al. (1999) conducted the feasibility study of SIXE as Co-PI, together with Prof. Jordi Isern (co-PI on the Spanish side), carried out by groups of IAS, CNR (Italy) – IEEC & INTA & UPC & CNM (Spain). The study, which began in early 1998, was funded by the PNIE (Plan Nacional Investigación Espacial) of Spain [ESP97-1784-E grant of PNIE (CICYT)]. The results of Phase-A study have been summarized in the papers by Giovannelli et al. (2001, 2002) and Isern et al. (2001).

Figure 15 shows the synthesis of the characteristics of SIXE. The fundamental characteristic of SIXE: Effective Area x Observing Time $\simeq 10^{10}$ cm^2 s. This value is at least an order of magnitude higher than those of all other experiments of the time.

SIXE was presented to ASI (Italian Space Agency) to ask for support for the phase-B study, also having the certainty that it would be the ideal payload for the Spanish MINISAT-02. Furthermore, the cost of the payload would have been shared with the Spanish Space Plan.
Absolutely no response from ASI.

Thirty years have passed since the idea of SIXE was published (Giovannelli, F., Sabau-Graziati, L., La Padula, C. et al., 1993). Currently the papers dealing with SIXE are the most read among all those of all INAF Institutes ($\gtrsim$ 2000 readers from all over the world) (source: Research Gate).

Another even older example dates back to 1975. Our group proposed a high angular resolution experiment for the observation of extragalactic sources in the 20-100 keV band, in particular galaxy clusters, through the use of a coded mask and our position-sensitive X-ray detectors (Auriemma et al., 1975). The experiment was supposed to fly aboard a stratospheric balloon on a long-duration flight from the Milo base (Trapani, Italy) along the 38th parallel. The proposal was presented during the conference "Italian Extragalactic Astronomy" (April 3, 1975). The Italian theorists strictly rejected the proposal, judging it impossible for galaxy clusters to emit hard X-ray radiation.

Twenty-four years later, BeppoSax revealed this issue (Fusco-Femiano et al., 1999)!

Figure 16 shows the cover of the internal report of the LAS-CNR (Laboratory of Astrophysics-CNR).

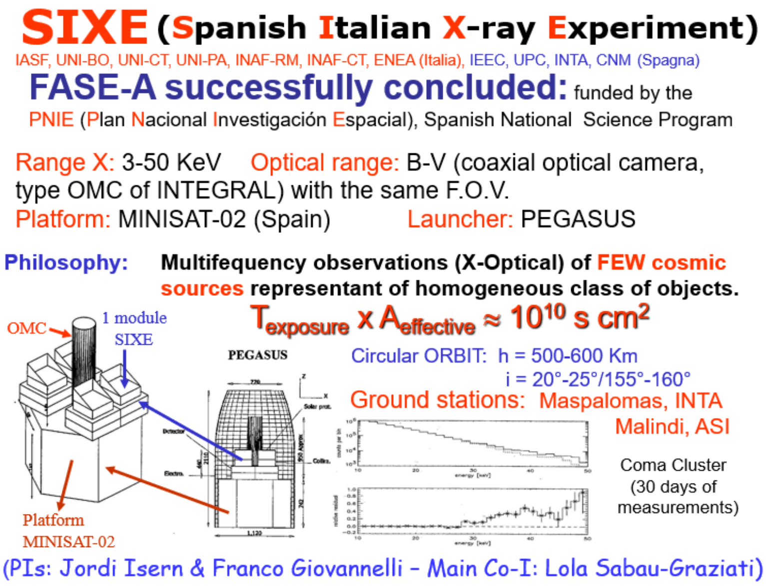

Figure 15: Summary of the main characteristics of SIXE (Spanish Italian X-ray Experiment), after phase-A study (deduced from Giovannelli et al., 2001, 2002).

PROPOSTA IN UN ESPERIMENTO AL ALTA RISOLUZIONE
ANGOLARE PER L'OSSERVAZIONE DI SORGENTI
EXTRAGALATTICHE NEL RANGE 20-100 KeV

G.Auriemma, E.Costa, F.Giovannelli*
G.Medici, P.Ubertini

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Frascati

*Attualmente presso l'Istituto di Fisica della
Atmosfera, C.N.R., Roma.

Comunicazione presentata al Convegno di Astronomia Extragalattica Italiana del G.N.A.
Asiago, 3 Aprile 1975

LAS-75-26 Luglio 1975

Figure 16: Proposal of a high angular resolution experiment for the observation of extragalactic sources in the 20-100 keV band (Auriemma et al., 1975).

The authors of this proposal: Giulio Auriemma, Enrico Costa, Franco Giovannelli, Pietro Ubertini were disciples of Professor Livio Gratton; Gastone Medici was the mechanical engineer of our group.

4. The reason for the Etruscan Wine Party

My full name is Franco Giovannelli Seghieri (father name: Flavio Giovannelli; mother name: Teresita Seghieri).

My ancestors of both families arrived to SUVERETO (a small medieval village close to Populonia, one of the most important Etruscan towns, before Romans) between the beginning and the middle of 19th Century. Giovannelli: an agricultural labourer family whose member Francesco – grandfather of my great-grandfather Francesco – arrived from Tuscan-Emilian Appennini Mountains for searching farm work. Seghieri: a blazoned family from Montecarlo di Lucca whose member Metello – my great-grandfather – arrived as town clerk.

Figure 17: Suvereto. First line, from the left to right: The southern gate "La Porta" (1300 A.C.); The northern gate "La Porticciola" (∼ 1300 A.C.); The loggia of judges (XIII Century); The village hall (XIII Century); Romanesque church of San Giusto "Ecclesia S. Justi" (IX-XII Centuries); St. Francis cloister "Il Chiostro di San Francesco" (XII Century). Second line, from the left to right: The tower "Il Torrione" (XIV-XV Centuries); My House (∼ XV Century); Great staircase "Gli Scaloni" (∼ XIII-XVI Centuries); The flag bearers of the fifteenth century "Gli Sbandieratori"; The Palio of Santa Croce of the barrels. Third line, from the left to right: Goblets of stars "Calici di stelle" (10th August); The source of the angels "La Fonte degli Angeli" (∼ 1500); Fortress Aldobrandesca "Rocca Aldobrandesca" (XII Century); Partial panorama of Suvereto. Fourth line, from the left to right: General panorama of Suvereto; PETRA Vineyard in San Lorenzo (hamlet of Suvereto); PETRA Olive grove in San Lorenzo (hamlet of Suvereto). These two last photos show a part of the farm built by my great-grandfather Francesco and belonging to Giovannelli's family until 1961.

Suvereto, considered one of the most beautiful villages in Italy, is located between the hills and the shining sea of the Etruscan Coast. Immersed in the green Val di Cornia, the village is a real treasure: its walls preserve treasures made up of characteristic medieval streets, stone houses, historic buildings and evocative churches. All around exterminated forests of chestnuts, oaks and,

Figure 18: Left panel: Franco Giovannelli as Baroncello in his old house in Suvereto. Right panel: a part of the historical cortege celebrating the conquest of the "Charta Libertatis" in 1201.

of course, corks, hence the name of the locality. Indeed, the toponym is attested for the first time in 973 and derives from the Latin suber, "cork", in Italian "sughero". Then the name of the village was Sughereto (foresta di sughero = cork forest) that was changed to Suvereto due to the local pronunciation of sughero as suvero. Therefore, Suvereto is the "cork forest".

Suvereto, the small medieval village, is the town of wine and olive oil. Figure 17 shows some important parts of the village and surroundings.

Suvereto became, thanks to Ildebrandino VIII of the Aldobrandeschi, the first free municipality of Tuscany, with the issue of the "Charta Libertatis" in 1201, October 14th, which granted freedom of trade and government to the inhabitants of the town. It is from this period the construction of the "Palazzo Comunale" (village hall) with the loggia of judges ("Loggia dei Giudici"), where disputes between citizens were resolved. Baroncello was the first mayor of Suvereto, elected by the people for treating with Ildebrandino VIII Aldobrandeschi, Count Palatino, the "Charta Libertatis". This important historical event is celebrated each year on December 8th in occasion of the "Sagra di Suvereto" (Suvereto Festival) after the historical cortege.

Baroncello is interpreted by Franco Giovannelli as shown in Fig. 18 (left panel), and Fig. 18 (right panel) shows a part of the historical cortege.

Despite having lived almost all my life in Rome, I have maintained a strong bond with Suvereto and with all my childhood friends. Until the harvest of 1960 I used to bring with a cart pulled by oxen the grapes to be fermented in a big vat, whose location was in "Casetta" - a typical farmhouse of the Maremma - belonging to the Casini and Petricci families. The Casini family moved to another place and the Petricci family instead continued to live there, where their vineyard thrives in the surrounding area. The young Petricci, who married a woman from the Del Pianta family, founded the Petricci-Del Pianta farm (Azienda Agricola Petricci-Del Pianta). From this company, which still uses the original vines of the area, come the wines consumed during the Etruscan Wine Party. Fig. 19 shows some pictures of the vineyard and wines produced by such a farm.

Figure 20 shows some of the participants during the Etruscan Wine Party of this workshop.

Figure 19: First line: a partial view of Petricci-Del Pianta vineyard. Second line from left to right: wine tasting cellar; Bianco di Casetta (white); Cerosecco (red); Buca di Cleonte (red); Fabula (white).

Figure 20: Left panel: Around the table for the Etruscan Wine Party. Right panel: Some Participants.

5. The reason for the night performance

The reason is very simple: every type of art increases knowledge and tones the soul. Physics is not just a science, but it is also a form of art, according to my judgment as I clearly pointed out in my concluding remarks of the "*XIVth Cracow Summer School of Cosmology: The structure of space and time* (Giovannelli, 1996).

Figure 21 shows few moments of the performance **Science's got talent** interpreted by Anna Lisa Amodio and Flavia Giovannelli.

6. The reason for the violin concert

For the same reason I expressed for the night performance, a violin concert is a moment of extreme pleasure for the audience. Music is a universal language that unify the souls of the humanity, and even is a relax for animals, as demonstrated for the cows producing milk in a better quality and quantity listening classical music. Moreover I am happy to sponsor young artists, like Isabella Perpich, excellent violinist in spite of her young age.

Figure 21: Left panel: Science's got talent by Anna Lisa Amodio and Flavia Giovannelli. Middle panel: Anna Lisa Amodio and Flavia Giovannelli. Right panel: The future of science as imagined by Anna Lisa Amodio and Flavia Giovannelli.

Figure 22: Left panel: Alessandro Perpich and Isabella Perpich during the concert. Middle Panel: Isabella Perpich. Right panel: The artists receive special thanks from an enthusiastic spectator.

Figure 22 shows two moments of the violin concert **Perpich**[2]: Left panel: Alessandro Perpich and Isabella Perpich during the concert. Middle Panel: Isabella Perpich. Right panel: The artists receive special thanks from an enthusiastic spectator.

7. Conclusions

In this workshop, the presence of women has been particularly pleasant and intentional as well as the presence of many young colleagues, some of them still PhD students.

This is the age of the youth. Young people do not depend on anyone or draw strength from others. The courage of young people is unparalleled. They fears nothing. The courage of youth is boundless, is the strength to never give up (Daisaku Ikeda, 2001).

Probably the most important scientist and artist ever born, Leonardo da Vinci, said *Tristo è lo discepolo che non supera lo maestro suo!*. Expressed in English, that reads as *Grim is the disciple who does not exceed his master!*

Figure 23: The extraordinary LOC. From left to right: Francesco Reale, Rosa Poggiani, Franco Giovannelli, Bruno Luigi Martino, Carlo Gaibisso, Massimo Pirani.

8. Special thanks

It is my pleasure to thank:

- the Scientific Organizing Committee (René Hudec, Joanna Mikolajewska, Giora Shaviv, Edward M. Sion, Paul Mason ... and myself).

- The super-efficient Local Organizing Committee (Rosa Poggiani, Francesco Reale, Franco Giovannelli, Bruno Luigi Martino, Carlo Gaibisso, Massimo Pirani) shown in Fig. 23 from left to right.

- Many thanks to the Directors of the:

- INAF-IAPS
- ASCR-AIO & CTU,
- PAN-N. CAC
- Dpt of Physics, Technion
- Villanova University

- New Mexico State University

Particular warm thanks to:

- ALL SPEAKERS, who rendered this workshop very interesting and alive.
- ALL PARTICIPANTS, who breathed life into the workshop with their question-answers, and for the friendly atmosphere they provided.
- The FOUR COLLEAGUES and FRIENDS (Paolo, Maria Giovanna, Janusz & René) who kindly accepted the not so easy task of making the concluding remarks of the workshop.
- The actresses Flavia Giovannelli and Anna Lisa Amodio for their splendid Performance *Science's got talent*.
- To all the staff of the SPLENDID Hotel La TORRE.
- Finally, on behalf of all participants, I would like to express my warm thanks to the Chèf, Mr Salvo Spada, who prepared for us a large number of delicacies.

Many particular thanks to Francesco Reale: ISC/CNR (Alias FIGARO) for helping in informatics and solving all related problems during the preparation and development of the workshop and in Palermo, at the registration desk, in the conference room, on the terrace, and ... more, together with

- Bruno Luigi Martino and Giorgio Gaibisso: IASI/CNR with their sincere kindness;

- Massimo Pirani: the new member of the LOC, very useful as an all-rounder;

- Rosa Poggiani: Physics Dpt, Pisa University with a smiling face behind her professional camera.

Without the presence of Francesco it would not have been possible to organize the workshop!

Francesco, alias FIGARO, is shown in Fig. 24 during one of his usual runs for something urgent.

Figure 25 shows the two youngest participants on either side of Franco Giovannelli, director of the workshop, after receiving the poster attesting to the passing of the baton from the old generation to the new.

Finally, Fig. 26 shows the official photo of the participant.

During this fruitful workshop I hope to have demonstrated once more the **Vulcano Theorem** enunciated in 1984 in my concluding address of the first historical Frascati Workshop on *Multifrequency Behaviour of Galactic Accreting Sources* (Giovannelli, 1985):

It is possible to develop science seriously even if smiling.

I hope to meet all of you once again during our next Palermo Workshop.

Acknowledgments This research has made use of NASA's Astrophysics Data System.

Figure 24: Francesco Reale, alias Figaro, running.

Figure 25: The two youngest participants on either side of Franco Giovannelli. From left to right: Yusuke Tampo, Franco Giovannelli, Helene Szegedi.

Figure 26: Official photo of the participants.

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