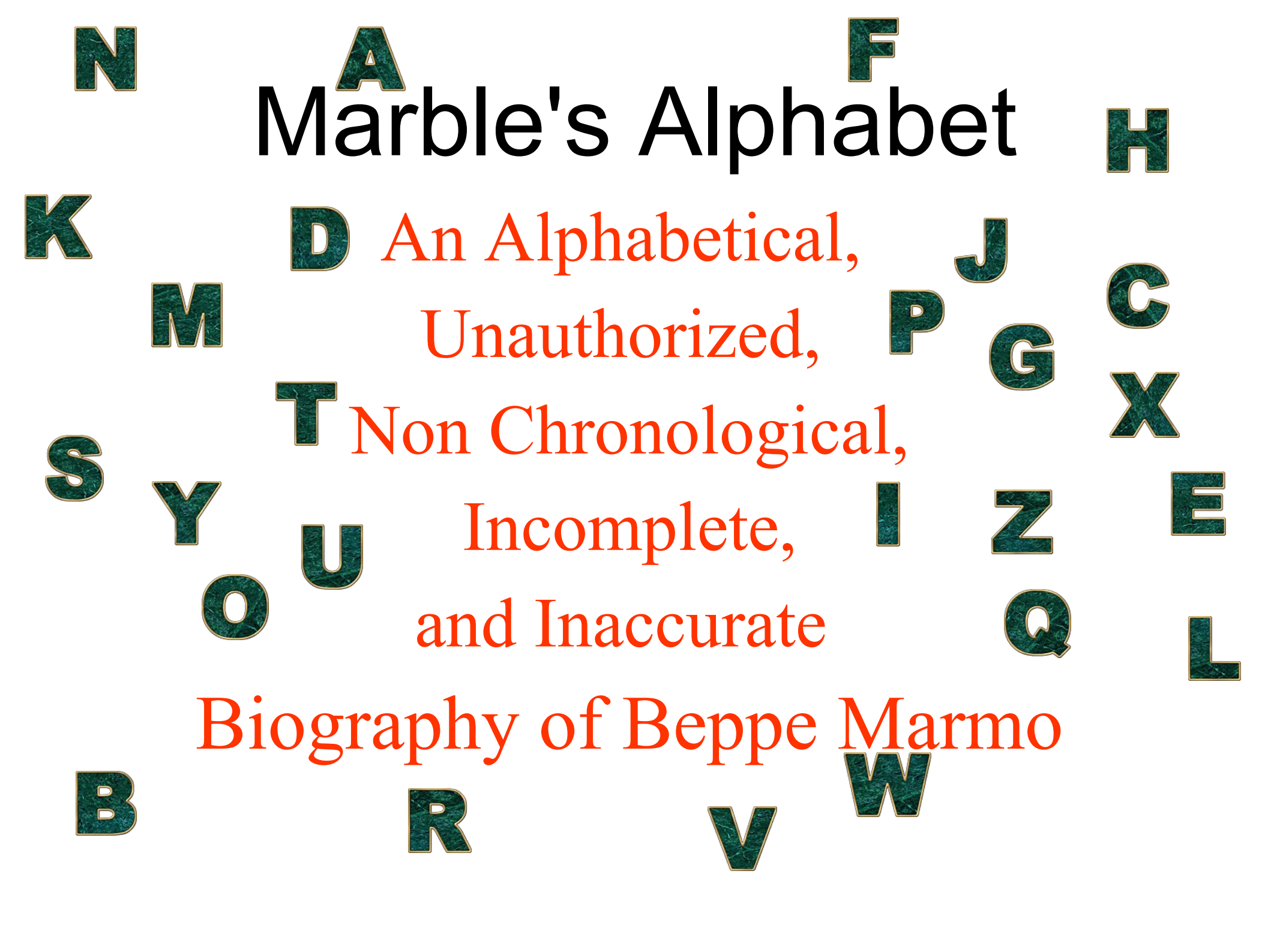
Marble's Alphabet
An Alphabetical,
Unauthorized,
Non Chronological,
Incomplete,
and Inaccurate
Biography of Beppe Marmo

for Zaccaria et. al.

Universal unfolding of Hamiltonian systems: From symplectic structure to fiber bundles

F. Zaccaria, E. C. G. Sudarshan, J. S. Nilsson, N. Mukunda, G. Marmo, and A. P. Balachandran

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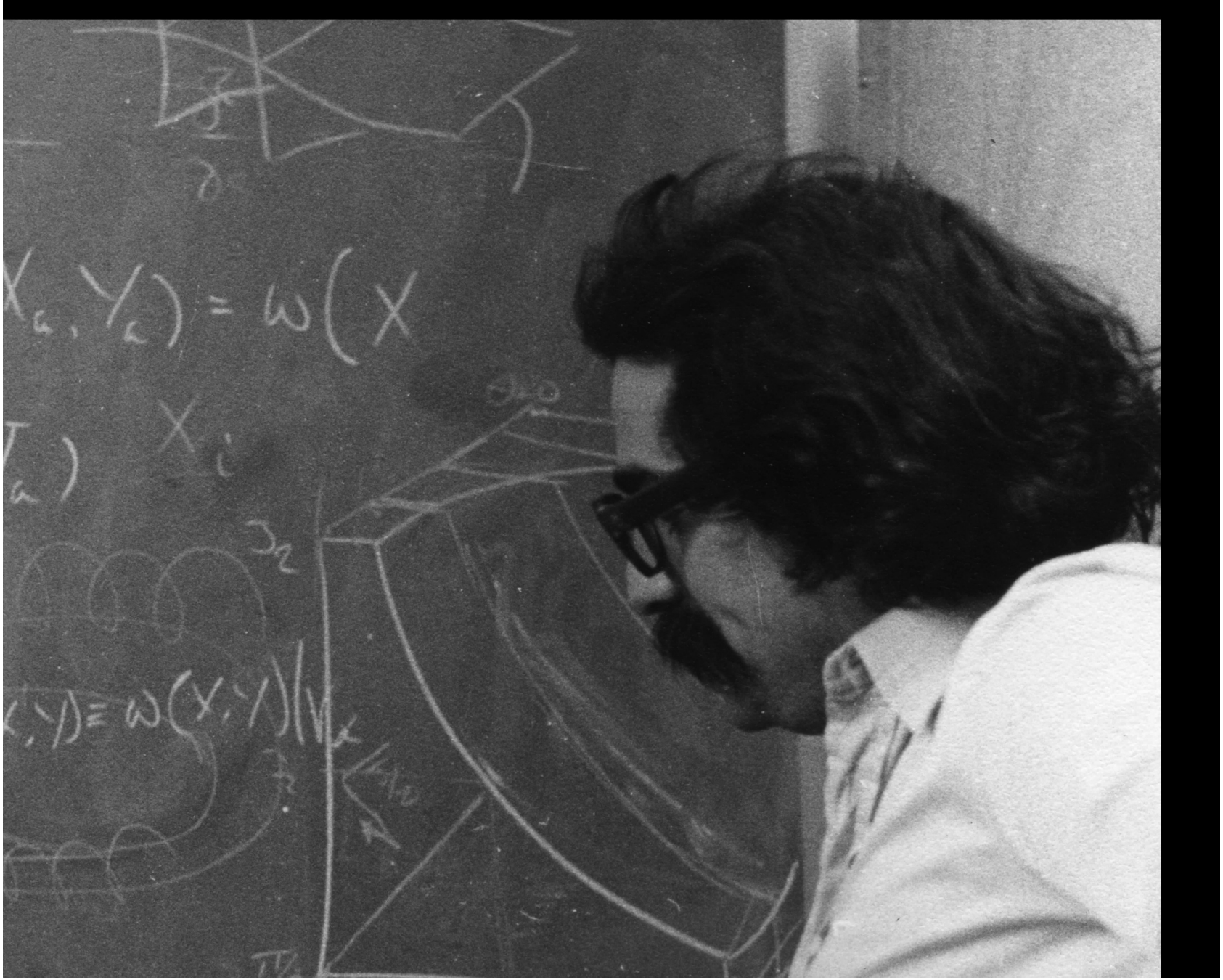
- As you can see Beppe is used to reverse alphabetical order.
- What is important of this article, as well as a set similar ones, was actually written here in Policeta, during extensive stages of study and work of this group of friends, in rather “crude” situations, not only there was no internet, or telephone, but apparently not even running water!

for Young

- I can confirm the rumours: Beppe was Young, once! In fact I met him when he was “almost young”.
- But even before, he was a student at the technical Institute “Alessandro Volta” in Napoli, leaving “la casa di Mamma” at the age of 14, compare with the average italian young man…
- He then was selected to enter the “Scuola Normale in Pisa”, at the same time as Claudio Rubano, but the political passion had the better of him (the roaring 60's), and he abandoned for a while the studies, resuming them in Napoli.



for x, the unknown in the equation

- When we have an equation, usually we sit down, and start calculating, or more likely open a *mathematica* session.
- This is not the way Beppe looks for a solution, he looks at it, finds the symmetries, makes a geometrical analogue and finds a solution modelling it on the solution of another well known problem.
- Then goes to the blackboard and writes it using a notation the average physicist has never seen before!

W for Weyl (but could be Wigner)

- I do not know who Beppe thinks his main inspiration among the fathers of QM has been, but in my opinion the Weyl-Wigner vision certainly fares prominent.
- Between Schrodinger waves and Heisenberg matrices, Weyl's view is the most “mechanical”, and therefore the most geometrical..
- The Weyl-Wigner correspondence appears over and over again is several papers, and in the Esposito-Marmo-Sudarshan text, or in work, with Morandi, Ercolessi....

for Vitale

- The original name for our group in Napoli is “il gruppo di Vitale”, it may become again so, but the Vitale in question was Bruno, non Patrizia.
- Coming from Geneva to Napoli, Bruno Vitale, originally a nuclear physicist, decided that in the periphery it was impossible to be in permanent contact with the recent experiments, and therefore decided to di classical mechanics, from a mathematical point of view.
- Then soon he decided to go into children psychology.
- So Beppe fell in the middle between nucleon-nucleon scattering and which software is best to teach children to read.

for Unfolding

- The idea that unfolding a dynamical system to render it simpler has always been central to Beppe's work.
- He has also applied it to groups and symmetries.
- What I have learned is that, up there, high up in dimensions, everything is either a free particle or a harmonic oscillator!

for tomography

- Quantum reconstruction of probabilities, or quantum tomography has been an important activity for Beppe.
- Pauli's hope to reconstruct a quantum state form the knowledge of probabilities in position and momentum space has been thwarted, quantum mechanics is not only probabilities.
- But this can be done using tomographic data. And this is very much in line with the classical/quantum transition that is one of the hallmarks of Beppe's view.

for Symplectic

- Geometria è Fisica
- but geometry is symplectic in Marmo's view!
- The word geometry comes form the measurements of fields, a pretty static activity.
- Not for Beppe, his geometry is dynamic, a way to encode motion, the equilibrium between position and momenta. He occasionally ventures in the tangent space, but at hart he is symplectic! But see later...

for Relativity (mostly general)

- General relativity is par excellence a geometrical description of nature.
- Could Beppe not work on it?
- Of course he looked at it form the symmetry point of view, starting from the symmetries of the Poincaré group, to the work with Bruno Preziosi, or the work on microlensing with Capozziello and other.
- And the R of relativity equally well stands for Ruggiero de Ritis, our departed friend who started the researches of relativity in Napoli with Giovanni Platania and later Esposito and Stornaiolo.

for Quantum

- It could not be anything else!
- Beppe has a very personal, needless to say geometrical, view of quantum mechanics.
- Yet it appears to be a “tardive love”. The first papers are in 1974, and the work was exclusively in classical mechanics, then in 1980 something on monopoles.
- After that the quantum aspect starts to appear, at first sporadically, monopoles, brackets, looks like an application of geometry.
- With the new millenium is the other way around, quantum mechanics now ***is*** geometry!

for Pecorino

- I think we all have tasted Beppe's pecorino, in its different forms!
- Pecorino, for Beppe, is not only a cheese, is also a way to do science.
- There are no papers by Marmo alone, research, for Beppe is a collective enterprise, do be done together, and it follows its ancients rites.
- And the sahring of food is one of the oldest, tasting Beppe's pecorino is to connect with all of his research.

for Oltremare (Mostra d')

- Beppe, like me and others, grew up at the “Istituto di Fisica Teorica”, at the Pavillon 19 of the former “Mostra dei Possedimenti di Oltremare” of the fascist era.
- An idillic place close to the the bowling alley, the amusement park and the zoo (at some point we also adopted an hippopotamus, and later Beppe's family contributed a cow to the animal collection).
- The Istituto had been founded by Caianiello in 1958 and has been home to many of us for 42 years.
- I like to add that, not having been designed by an architect, it was perfect for an university institute!

collection).

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for Noncommutative Geometry

- It is not a case of *Cicero Pro Domo Sua.* Although NCG has been my main interest for years, Beppe, geometer as he is, quantizer as he is, could not miss this chance.
- NCG is mostly an algebraic theory, but Beppe managed to marry it very well with his vision, especially in early papers with Landi and Vilasi, but not only. In the end for Beppe also Algebra is Geometry!
- Later, collaborating with Bal, Ibort and others, and with a Manko and others, he also worked on deformed products, beyond the usual Moyal one.

for Man'ko (Volodia but not only...)

- Volodia (and family) have been collaborators of Beppe for many years on important topics such as quantum tomography, quantum optics and quantum information.
- Interestingly enough, according to Google Scholar the first paper of Beppe with Volodia (and with Capozziello, De Ritis and Marino), was on gravitational microlensing in 1997.
- Then pretty soon they hit the “quantum wave”. Volodia is to be credited for making Beppe collaborate with experimentalits! There is joint work in fact with Salvatore Solimeno and Alberto Porzio.

For Lie (Sophus)

- The name of Lie appears very often in Beppe's production (31 times on the page of Google Scholar), and in several guises: Lie algebras, groups, algebroids and bialgebroids, Lie-Scheffers (with Pepin and Janusz), Lie-Jordan with Ibort and Falceto, Lie-Poisson (with me, Sparano and Vitale), Lie superalgebras, Lie-Jacobi (With Vinogradov) Lie theorem.
- Geometry, symmetries, the main toll cannot but be group theory, and for symmetry the groups are Lie Groups, and their descendants, and in general the vision of mathematics of Sophus Lie is the one Beppe found very apt for his view of geometry.

for Km Zero

- Km zero is the point from which distances are measured in cartography. The road equivalent of the origin in cartesian coordinates. In the Roman Empire it was the top of the Capitoline hill, in Spain it is Puerta del Sol, in India is Ghandi's memorial,in France is Notre Dame.
- For Beppe it is San Rufo, all the distance he covered, physically and metaphorically, start from here, or rather the house in town.
- And to be more precise, Km Zero is its cellar!

for Jacobi (Carl Gustav)

- Like Lie, Jacobi's name appear often in Beppe's work, but usually with others, Hamilton, Nambu.
- Jacobi was mostly an analyst and a number theorist, and his main interest was differaial equations, but he contributed to dynamics, and in particular the Hamilton-Jacobi formulation of classical mechanics is at the same time geometric, and almost quantum.
- Beppe also worked with Janusz on graded Jacobi algebras.

for Integrability

- Integrable systems are the aristocracy of classical mechanics, and Beppe has done work on it, often in collaboration with Vilasi.
- In particular he characterized IS in terms of spectral properties of tensor fields. Again algebra and geometry in synergy!
- There have been other works on integrable systems, notably with Michor and Grabowski, Rubano.
- Could quantum integrability be missed? Of course not, there is a new definition of it with Jesus Clemente. I don't have to tell you that it is geometrical!

for Hamilton

- In the never ending dicotomy between Lagrangian and Hamiltonian view of dynamics, Beppe is mostly in the Hamiltonian camp.
- I suspect that to travel in Napoli, if Beppe could, would go on a “cotangenziale”!
- But this did not preclude him to work even on path integrals with Ibort and Asorey, but really to say the Hamiltonian is better...
- But Beppe is not only Hamitonian, he can also be bihamiltonian, with several people, like Simoni, Saletan, Franco Magri...

for George (Sudarshan)

- The Rochester connection between George and Caianiello is fundamental for the development of theoretical physics in Napoli.
- George has been influential for Beppe, and directly and indirectly for all of us.
- There have been two “Sudarshan periods”.
- The first in the eighties, with Mukunda, Bal, Nilsson, Zaccaria, Simoni…, mostly on solitons and field theory.
- And the present one, started at he millennium, when the emphasis is on quantum information, entanglement, Zeno's paradox, with Pascazio, Facchi,Kus…
- A product of his collaboration with George and Giampiero Esposito,is “the book” on quantum mechanics, a distillation of his view for old and young students.

Franco (Ventriglia)

- I am the last speaker, and is customary for him to thank the organizers.
- Except tha I am one of the organizers.
- Except that in reality I did not do anything.
- Franco did most of the work, with the help of a couple of Patrizia's, and Beppe himself.
- So the alphabet suggests that I join you in the thanks to Franco and the other (real) organizers.

for Eugene (Saletan)

- Eugene, or Gene, Saletan has has had profound influence at the beginning of the career of Beppe, during extended visits in the Ite seventies.
- In particular the writing of the book “*Dynamical systems. A differential geometric approach to symmetry and reduction*”, by Saletan, Simoni, Marmo and Vitale, served as a focus point in a period of social unrest, Vitale's abdication, and scant research in Napoli.
- Beppe spent long periods in Boston, with Ellen and Gene, often at their home. And Gene was so close to Beppe that he got married in San Rufo!

for Dell'Antonio (Gianfausto)

- To prepare this talk I used heavily Beppe's google scholar page. Which comes in order of the number of citations.
- If you search for the word “Dell'Antonio” you will not get anything.
- Yet another failure of bibliometry! Gianfausto is another of the main influence on Beppe's research (as well as Napoli's theory).
- He was the advisor of Beppe's perfezionamento (a precursor of the Ph.D. which Caianiello introduced in Napoli), nad is responsible for the introduction of many mathematical physics threads and interests of Beppe.

for Computer

- Beppe found the first switch to a computer in his fifties. Before that, even as local INFN coordinator, he had to ask someone to fill the electronic form.
- Later it become clear that it was not that Beppe was not ready for computers, it were the computers that were not ready for Beppe!
- When computing and information became finally quantum ,then Beppe was there! Not so much on computing, but very much on information.
- I do not know if it was Volodia, Saverio, Paolo or George “fault”, but the fact is that I have heard better utter the word “bit”, obviously preceeded by a q.
- And also the on/off word of computation got its geometry!

for Balachandran (and his students)

- Bal was the advisor of Beppe' undergraduate thesis together with Bruno Vitale. It was on the representations of the Poincarè group.
- And Bal is another strong influence on out group. Beppe spent long periods in Syracuse, where he worked on various topics, includings monopoles, topology, anomalies, statistics and with Bal, , Skagerstarm, Sorkin...
- And he worked with many of the many students of Bal: Peppe Bimonte, Elisa Ercolessi, Gianni Sparano, Nair, Rajeev, Srivastava, Martone, Jo, Vaidya, and last and least Lizzi.

For Auguri

Happy 70 Beppe!