«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE

INTERNATIONAL SCHOOL OF COSMIC-RAY ASTROPHYSICS
«MAURICE M. SHAPIRO»

23rd Course: "Multi-Messenger Astroparticle Physics" 20 – 28 July 2024

PRESIDENT AND DIRECTOR OF THE CENTRE: PROFESSOR A. ZICHICHI

DIRECTORS OF THE COURSE: PROFESSORS J.R. HÖRANDEL, T. STANEV, R. SPARVOLI - J.P. WEFEL (director emeritus)

WELCOME!

In the mid 1970's, discussions among Rossi, Shapiro and others recognized the need for continuing international education in the then emerging field of Cosmic Ray Astrophysics.

Prof. Zichichi who, in 1963, had founded the EMFCSC, agreed to establish the ISCRA as one of the Erice Schools, offering biennial courses with Shapiro as director.

Antonio Zichichi and Maurice M. Shapiro circa 2004

ISCRA School and Course Directors:

Maurice M. Shapiro, Rein Silberberg, John P. Wefel, Vladimir Ptuskin, Todor Stanev, Piero Galeotti, Jörg R. Hörandel, and Roberta Sparvoli

Executive Secretary:

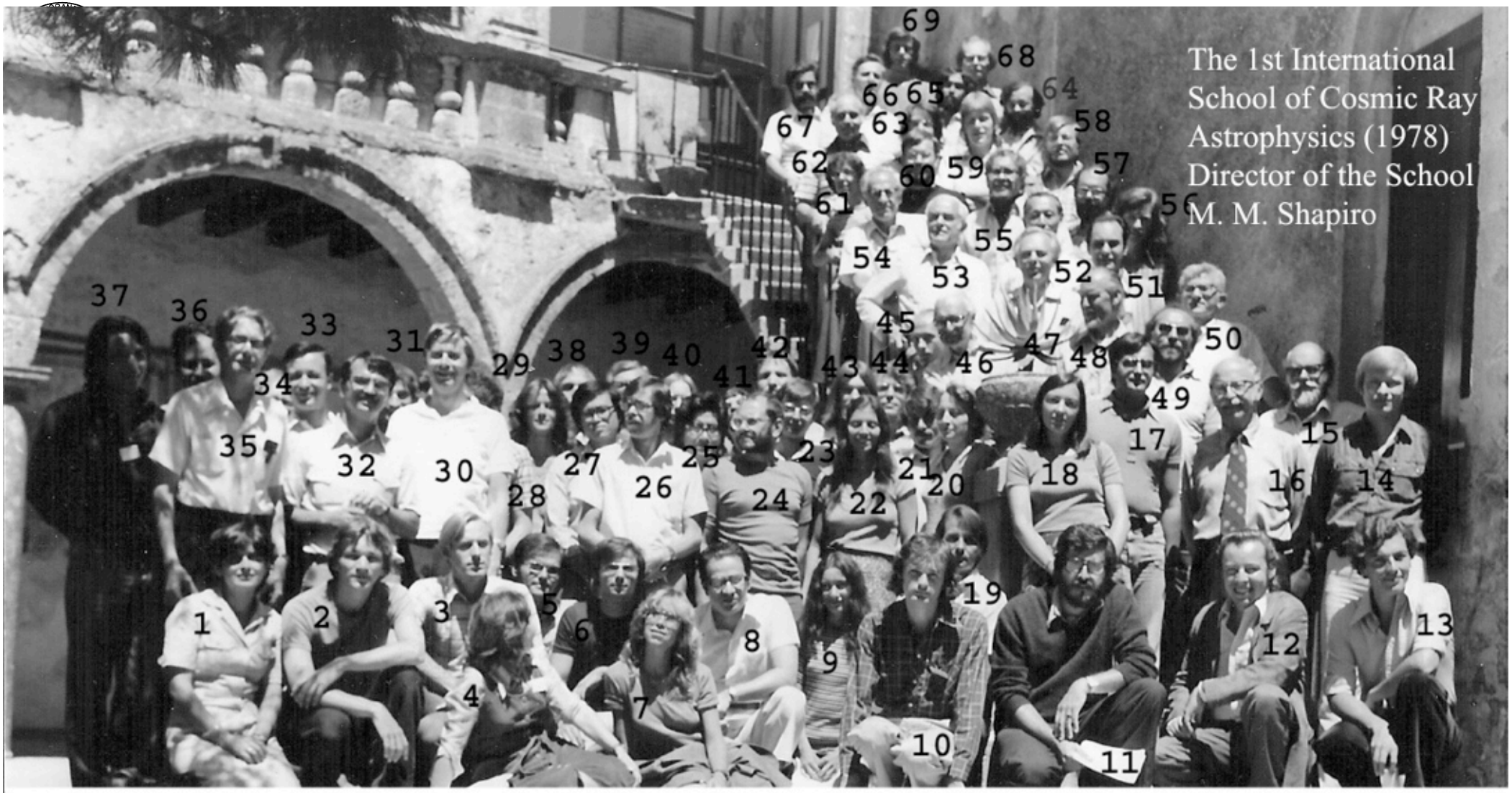
Arthur Smith

1978: Progress and Problems in Cosmic Ray Physics
1980: Acceleration of Particles in Nature
1982: Composition and Origin of Cosmic Rays *
1984: Cosmic Radiation in Contemporary Astrophysics *
1986: Genesis and Propagation of Cosmic Rays *
1988: Cosmic Gamma Rays and Cosmic Neutrinos *
1990: Cosmic Rays, Supernovae, and the Interstellar Medium *
1992: Particle Astrophysics and Cosmology *
1994: Currents in High Energy Astrophysics *
1996: Towards the Milennium in Astrophysics: Problems and Prospects *
1998: New Vistas in Astrophysics *
2000: Astrophysical Sources of High Energy Particles and Radiation *
2002: Relativistic Astrophysics and Cosmology *
2004: Neutrinos and Explosive Events in the Universe *
2006: Astrophysics at Ultra-high Energies *
2008: Gamma Ray and Cosmic Ray Astrophysics: From Below GeV to Beyond EeV Energies
Including tribute session for Maurice M. Shapiro, who had passed the previous year. ISCRA named in his honor.
2010: Astro & Particle Physics: From Underground to Outer Space
2012: A new Era in Particle Astrophysics: New instruments, New Results and New Understanding
2014: Exploring the High Energy Universe
2016: Particle, Gamma-ray and Neutrino Astrophysics in the 21st Century
2018: Astroparticle Physics: Yesterday, Today and Tomorrow
2020: no course, Covid-19
2022: From Cosmic Particles to Gravitational Waves: Now and To Come
2024: Multi-messenger Astroparticle Physics

* Hardcopy Proceedings Volume

23 courses
topics evolved
cosmic-ray astrophysics

astroparticle physics
- ***direct & indirect measurements of cosmic rays***
- ***gamma-ray astronomy***
- ***neutrino astronomy***
- ***gravitational waves***



1	2 Jeremy Lloyd-Evans	3 Ray Wills?	4	5	6 J. Kempler	7 Janet Luhmann	8 Kostas (Greek, Milan?)
9 Ellen Zweibel	10 G. Erdös (?)	11 Vic Stenger	12 Jorge Perez-Pereza	13 Yves David	14 John Clifford	15 Jake Waddington	16 Maurice Shapiro
17 Juan Sequiros	18 Carmen Baixeras	19	20 Maria Giller	21 G. Siegmon	22 Elana Ashley	23 Andy Strong ?	24 Rudolph Beaujean
25	26 Javiev Ottaola	27	28 Helina Bilokon	29	30 Einar Juliusson	31	32
33	34	35 Rein Silverberg	36	37 Oscar Saavedra	38 Willi Niemann	39	40
41	42 Reinhard Schlickeiser	43	44 T. Gregory Guzik	45	46	47 Peter Fowler	48 John Linsley
49 Piero Galeotti	50 Harm Moraal	51	52 Satio Hayakawa	53 John Simpson?	54 Fred Reines	55 David Schramm	56 Roger Bussard
57 Todor Stanev	58 John Cooper	59 Simon Swordy	60 Steve Jordan	61	62 Reuven Ramaty	63	64 J C Carvalho
65 Subir Sarkar	66 Arnold Wolfendale	67	68 Alan Watson	69			

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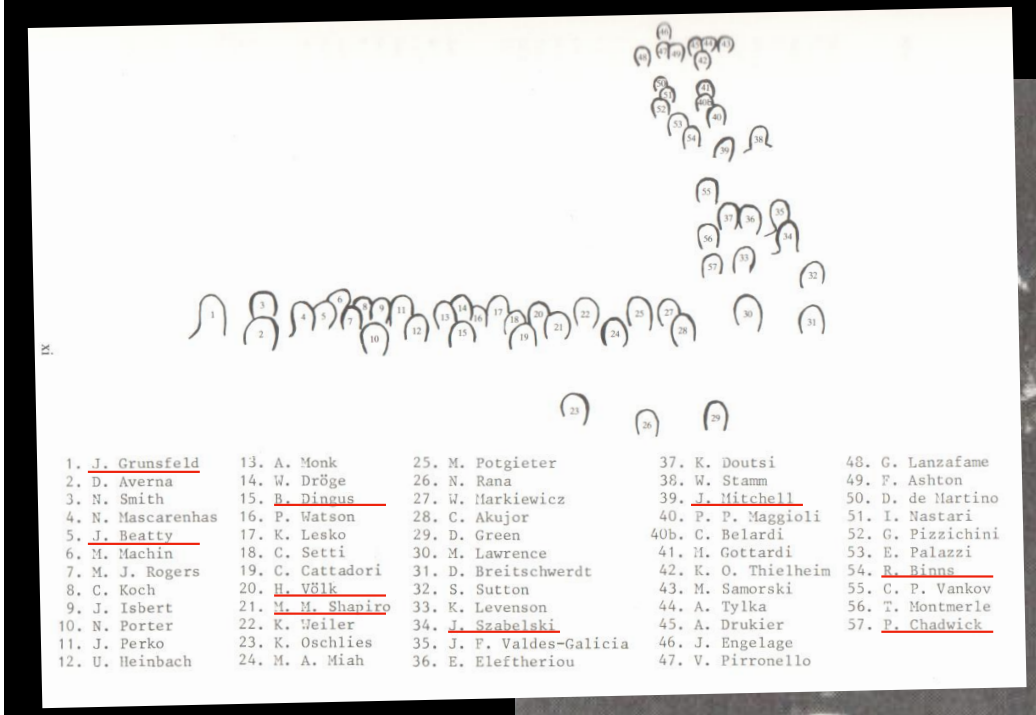
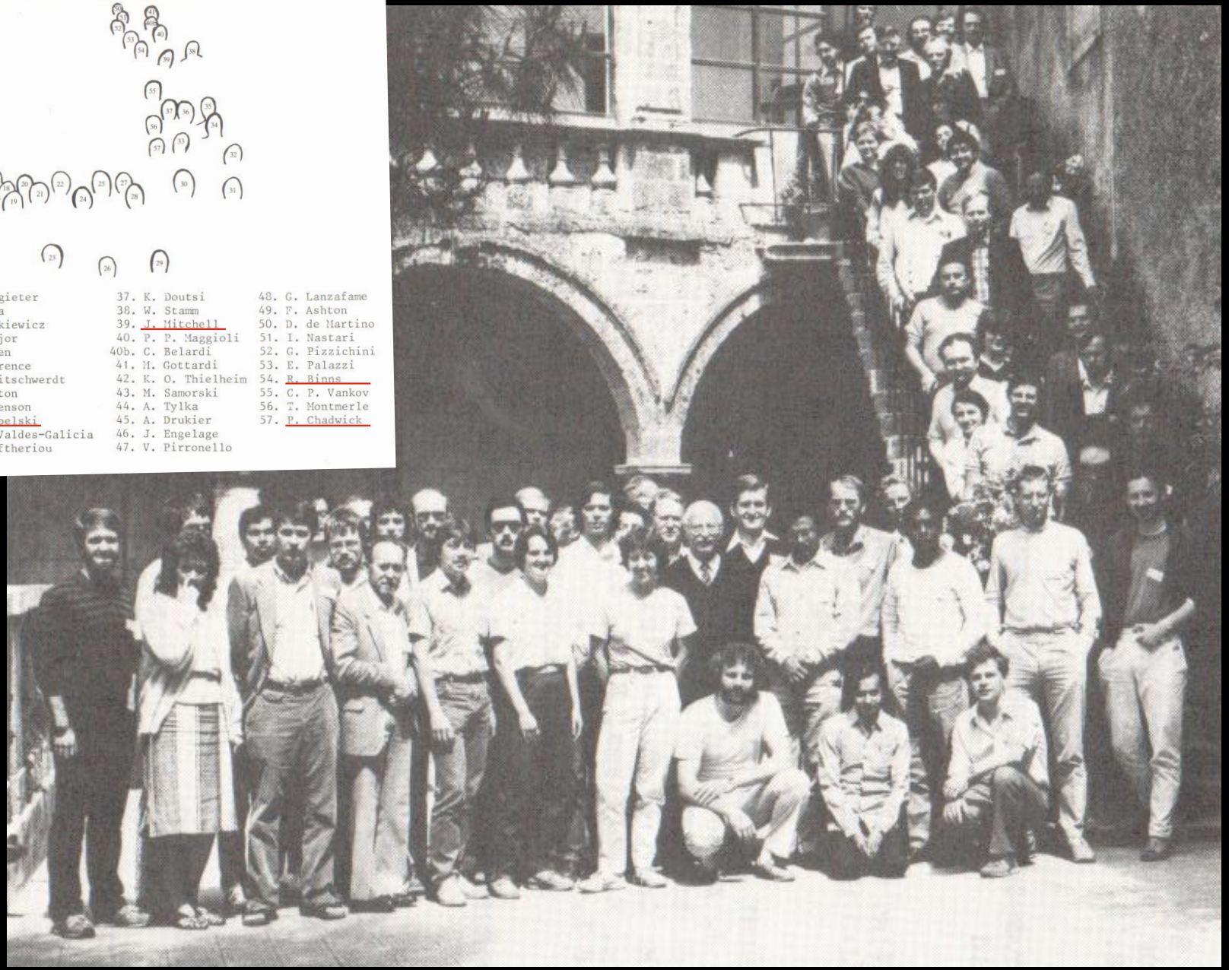
International School of Cosmic Ray Astrophysics 1986



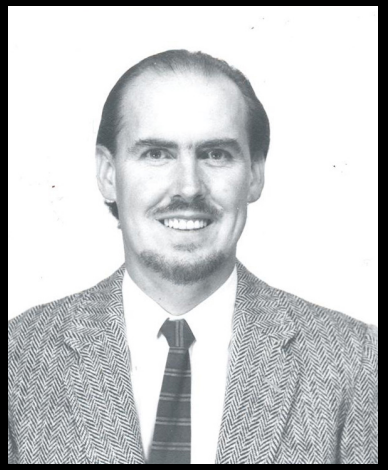
1. J. Grunsfeld
2. D. Averna
3. N. Smith
4. N. Mascarenhas
5. J. Beatty
6. M. Machin
7. M. J. Rogers
8. C. Koch
9. J. Isbert
10. N. Porter
11. J. Perko
12. U. Heinbach
13. A. Monk
14. W. Dröge
15. B. Dingus
16. P. Watson
17. K. Lesko
18. C. Setti
19. C. Cattadori
20. H. Völk
21. M. M. Shapiro
22. K. Weiler
23. K. Oschlies
24. M. A. Miah
25. M. Potgieter
26. N. Rana
27. W. Markiewicz
28. C. Akujor
29. D. Green
30. M. Lawrence
31. D. Breitschwerdt
32. S. Sutton
33. K. Levenson
34. J. Szabelski
35. J. F. Valdes-Galicia
36. E. Eleftheriou
37. K. Doutsi
38. W. Stamm
39. J. Mitchell
40. P. P. Maggioli
40b. C. Belardi
41. M. Gottardi
42. K. O. Thielheim
43. M. Samorski
44. A. Tylka
45. A. Drukier
46. J. Engelage
47. V. Pirronello
48. G. Lanzafame
49. F. Ashton
50. D. de Martino
51. I. Nastari
52. G. Pizzichini
53. E. Palazzi
54. R. Binns
55. C. P. Vankov
56. T. Montmerle
57. P. Chadwick

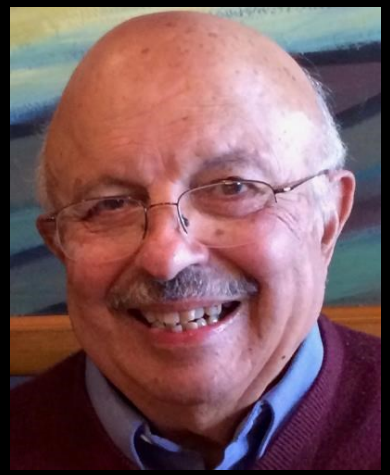
Grunsfeld
SpaceShuttle 1995-2009



International School of Cosmic Ray Astrophysics 1988

Edoardo Amaldi
Peter Biermann
Alexander Chudakov
David Kieda
John Linsley
Gianni Navarra
Livio Scarsi
Maurice Shapiro
Rein Silberberg
Todor Stanev
Floyd Stecker
Simon Swordy
K.O. Tielheim
John P. Wefel
Tadeusz Wiebig
Arnold Wolfendale
Guarang B. Yodh




International School of Cosmic Ray Astrophysics 1990

James Buckley
Rolf Büttikofer
Luke O'Connor Drury
Sunil K. Gupta
Albrecht Karle
Vladimir Ptuskin
Dolores Rodriguez Frias
Erwin Schopper
Maurice Shapiro
Rein Silberberg
Manfred Simon
Todor Stanev
John P. Wefel
Arnold W. Wolfendale

Erwin Schopper
PhD in group of Regener in Stuttgart
Apollo-Sojus Test Project 1975

International School of Cosmic Ray Astrophysics 1992

Evgeny Berezhko
Konrad Bernlöhr
Lev Dorman
William Fowler
Einar Juliusson
Frank Krenrich
Jeremy Lloyd-Evans
Martin Pohl
Raymond Protheroe
Eun-Suk Seo
Maurice Shapiro
Rein Silberberg
Todor Stanev
Klaus Tielheim
John P. Wefel
Arnold W. Wolfendale

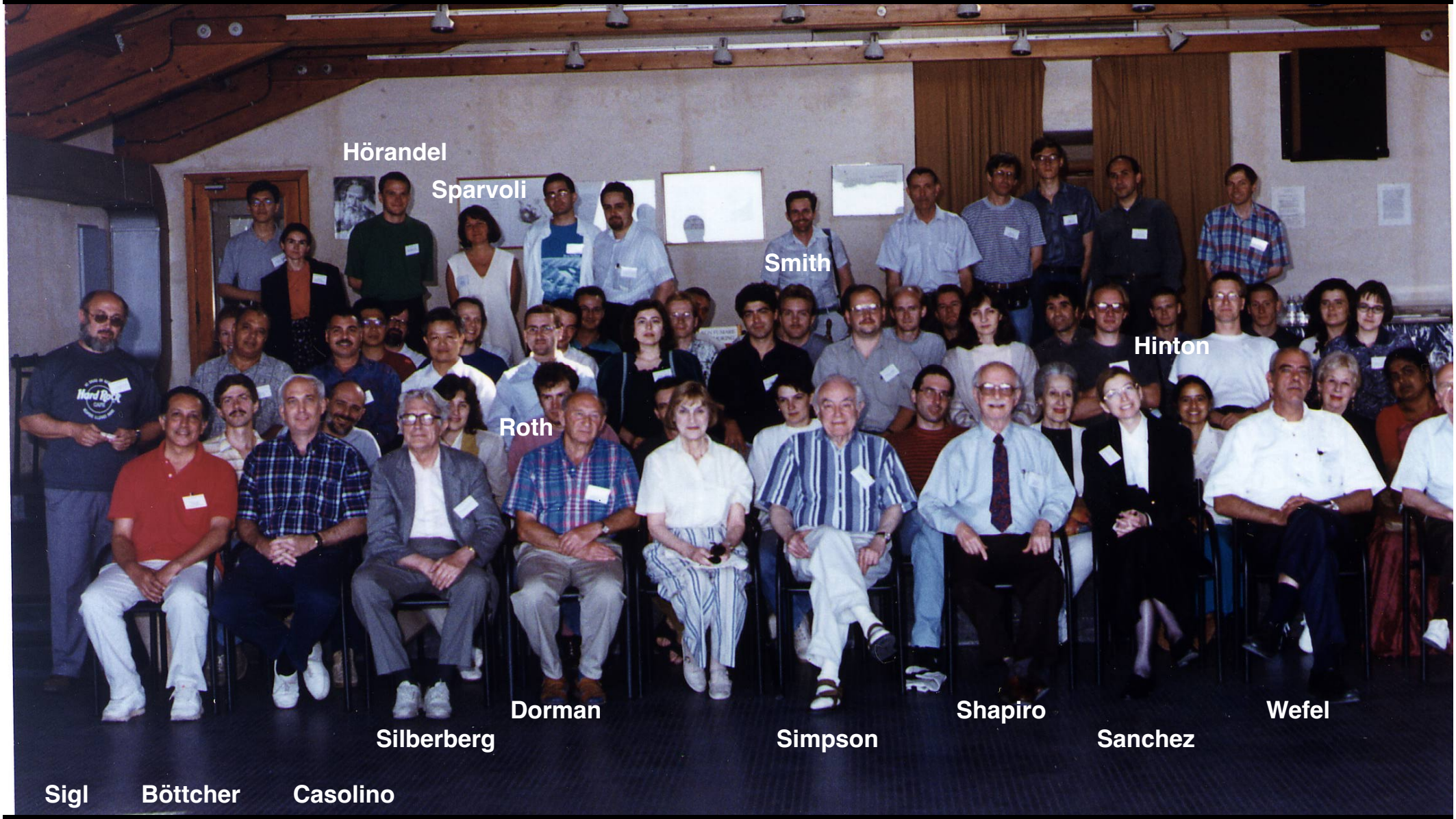
International School of Cosmic Ray Astrophysics 1994

Lev Dorman
Vitaly L. Ginzburg
German Hermann
Gottfried Karbach
Georg B. Kristiansen
Clem Pryke
Olaf Reimer
Maurice M. Shapiro
Rein Silberberg
Arthur E. Smith
Todor Stanev
Klaus Tielheim
John P. Wefel

Vitaly L. Ginzburg

Olaf Reimer
as lecturer 2016

International School of Cosmic Ray Astrophysics 1996



International School of Cosmic Ray Astrophysics 2004


Aharonian


Goodman


Müller


Kuzmin


Smith


Teshima


Maris


Scherini


Ptuskin


Riccobene


Hörandel

International School of Cosmic Ray Astrophysics 2006


Spiering


Smith


Privitera

International School of Cosmic Ray Astrophysics 2008

Watson

INTERNATIONAL SCHOOL OF COSMIC-RAY ASTROPHYSICS: ● Progress and Problems in Cosmic Ray Physics - 1978 ● Acceleration of Particles in Nature - 1980 ● Composition and Origin of Cosmic Rays - 1982 ● Cosmic Radiation in Contemporary Astrophysics - 1984 ● Genesis and Propagation of Cosmic Rays - 1986 ● Cosmic Gamma Rays and Cosmic Radiation - 1988 ● Cosmic Rays, Supernovae, and the Intersellar Medium - 1990 ● Particle Astrophysics and Cosmology - 1992 ● Currents in High Energy Astrophysics - 1994 ● Toward the Millennium in Astrophysics: Problems and Prospects - 1996 ● New Vistas in Astrophysics - 1998 ● Astrophysical Sources of High Energy Particles and Radiation - 2000 ● Relativistic Astrophysics and Cosmology - 2002 ● Neutrinos and Explosive Events in the Universe - 2004 ● Astrophysics at Ultra-high Energies - 2006 ● Gamma Ray and Cosmic Ray Astrophysics: From below GeV to beyond EeV Energies - 2008 ● Astro & Particle Physics: From Underground to Outer Space - 2010 ● A New Era in Particle Astrophysics - 2012: ● Exploring the High Energy Universe – 2014 ● Particle, Gamma-ray and Neutrino Astrophysics in the 21st Century – 2016 ● Astroparticle Physics: yesterday, today, and tomorrow – The 40th anniversary of the ISCRA – 2018 ● From Comic Particles to Gravitational Waves – now and to come - 2022

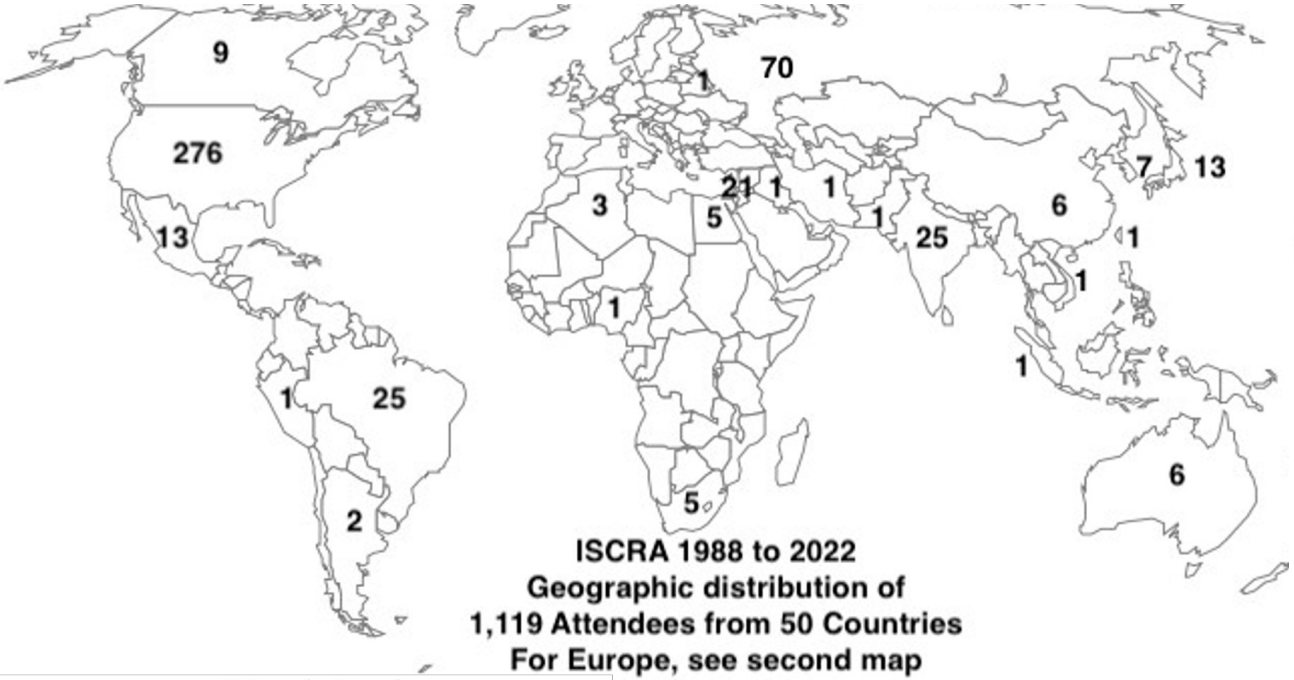
In case of questions, contact one of the directors

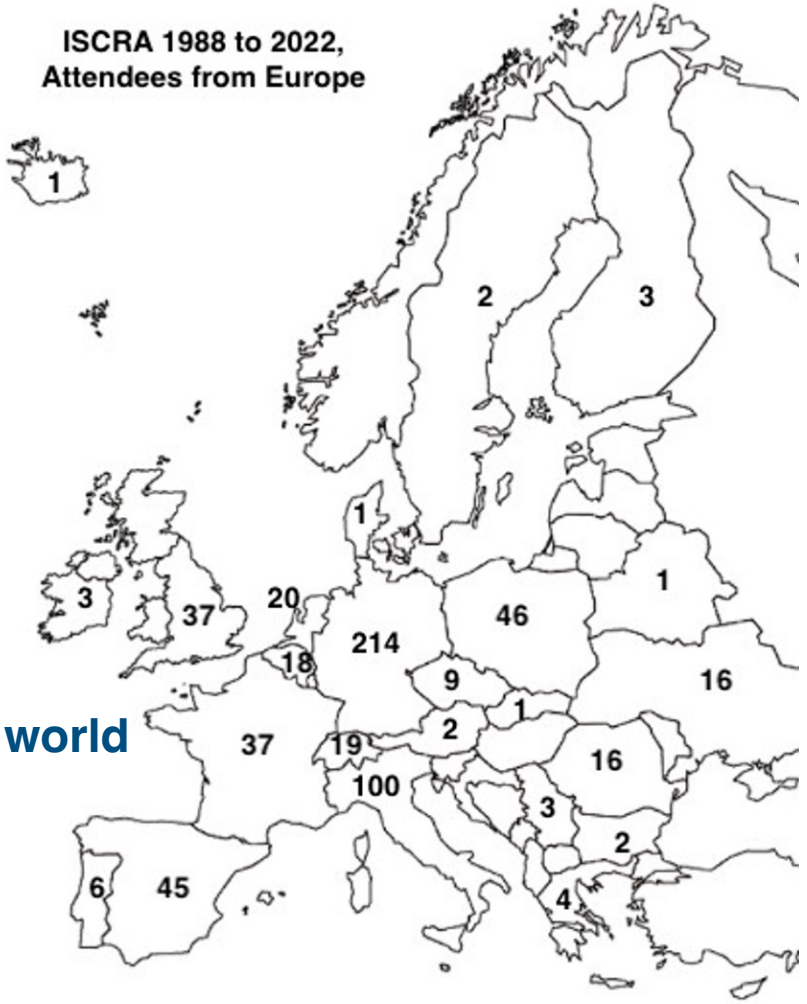
Roberta Sparvoli **Jörg Hörandel**

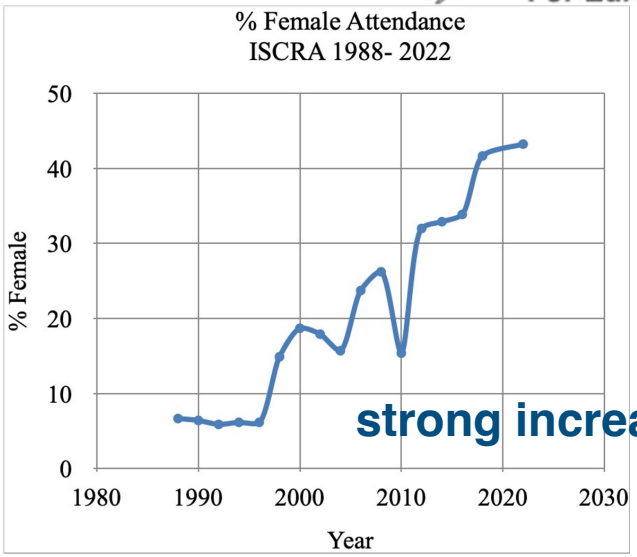
or our scientific secretary

00 39 7890 638 035

Arthur Smith







participants from around the world

strong increase of female participants

in the last 40 years ~1400 participants (lecturers, senior researchers, and students)

We have 11 lecturers.

We have almost 90 participants.

We have friends from about 18 countries being present.

THE ERICE STATEMENT

- *It is unprecedented* in human history that mankind has accumulated such a military power to destroy, at once, all centres of civilization in the world and to affect some vital properties of the planet.

  The *danger* of a nuclear holocaust is not the unavoidable consequence of the great development of pure Science.

  In fact, *Science* is the study of the Fundamental Laws of Nature.

  Technology is the study of how the power of mankind can be increased.

  Technology can be for peace and for war. The choice between peace and war is not a scientific choice. It is a cultural one: the *culture of love* produces peaceful technology. The *culture of hatred* produces instruments of war. Love and hatred have existed forever. In the bronze and iron ages, notoriously pre-scientific, mankind invented and built tools for peace and instruments of war. In the so called "modern era" it is imperative that *culture of love* wins.

  An enormous number of scientists share their time between pure Science research and military applications. This is a fundamental source for the arms race.

  It is necessary that a *new trend* develops, inside the scientific community and on an international basis.

It is of vital importance to identify the basic factors needed to start an effective process to protect human life and culture from a third and unprecedented catastrophic war. To accomplish this it is necessary to change the peace movement from a unilateral action to a truly international one involving proposals based on mutual and true understanding.

- **Here are our proposals:**

  1. Scientists who wish to devote all of their time, fully, to study theoretically or experimentally the basic laws of Nature, should in no case suffer for this free choice, to do only pure Science.
  2. All Governments should make every effort to reduce or eliminate restrictions on the free flow of information, ideas and people. Such restrictions add to suspicion and animosity in the world.
  3. All Governments should make every effort to reduce secrecy in the technology of defense. The practice of secrecy generates hatred and distrust. To start a ban for military secrecy will create greater stability than offered by deterrence alone.
  4. All Governments should continue their action to prevent the acquisition of nuclear weapons by additional nations or non-national groups.
  5. All Governments should make every effort to reduce their nuclear weapons stockpiles.
  6. All Governments should make every effort to reduce the causes of insecurity of non-nuclear powers.
  7. All Governments should make every effort to ban all types of nuclear tests in war technology.

- **Conclusion**

  Those scientists — in the East and in the West — who agree with this «Erice Statement», engage themselves morally to do everything possible in order to make the *new trend*, outlined in the present document, become effective all the world over and as soon as possible.

- This Statement was written in ERICE, August 1982, by Paul A.M. DIRAC, Piotr KAPITZA and Antonino ZICHICHI. By now the number of signatories of the Erice Statement has exceeded ninety thousands, the world over.

- The 'Erice Statement' has attracted, in the eighties, the attention of World Leaders such as Deng Xiao Ping (China), Mikhail Gorbachev (USSR), Olof Palme (Sweden), Sandro Pertini (Italy), Ronald Reagan (USA), Pierre Trudeau (Canada) and stimulated various actions on their part for a Science without secrecy and without frontiers.

- **Here are our proposals:**

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ISCRA 2024: 23rd Course:

Multi-Messenger Astroparticle Physics