

YEARS/ANS **CERN**

**CERN**  
**and**  
**Eastern European**  
**countries**  
**during the Cold War**

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**Anniversary memories...**

# Why me?...

Probably, because I am sufficiently old to remember Cold War times...

And, as a Pole, living in most liberal „barrack“ of the „Socialist Camp“ – as colloquially we called our country those years, I was allowed to travel... In Poland, towards the end of the 1950s we had a “thaw”, which extended into 1960’s and 1970’s... – and the country was relatively liberal... I spent 6,5 years at the Joint Institute of Nuclear Research in Dubna, in the Soviet Union... Later, I spent about 10 years at CERN, on shorter and longer stays, including few years as a head of CERN’s ECP division... And, in-between, I spent some years at Max Planck Institute in Munich and at the Universities of California and SLAC... It was a bit special that my first visits to CERN and USA were from... Dubna, Soviet Union...

For me it was very interesting to dive into the history of East-West cooperation in physics, as not all facts were known to me... I collected information from many physicists of Eastern Europe - however I must apologize that not all facts will find place in my talk, as to squeeze 45 years of rather intensive activities in 35 minutes is not possible...

# Prehistory...

**Maria Skłodowska-Curie**, a laureate of two Nobel Prizes (1903, 1911), a pioneer of women rights, international cooperation and technology transfer...

At the Radium Institute in Paris, in the Curie Lab., which she supervised, 47 women (25 from outside France!) worked in the period of 1904-34

After the Second World War many scientists, intellectuals and politicians were concerned about the weakness of European science: P.Auger, F.Perrin, E.Amaldi, F.deRose, G.Bernardini, H.A.Kramers, D.de Rougemont, etc., but also Americans: R.Oppenheimer, etc., inbetween **Isidor Rabi**... – it was him, who in 1950, at the UNESCO conference in Florence, proposed a resolution on „European cooperation in nuclear physics”...

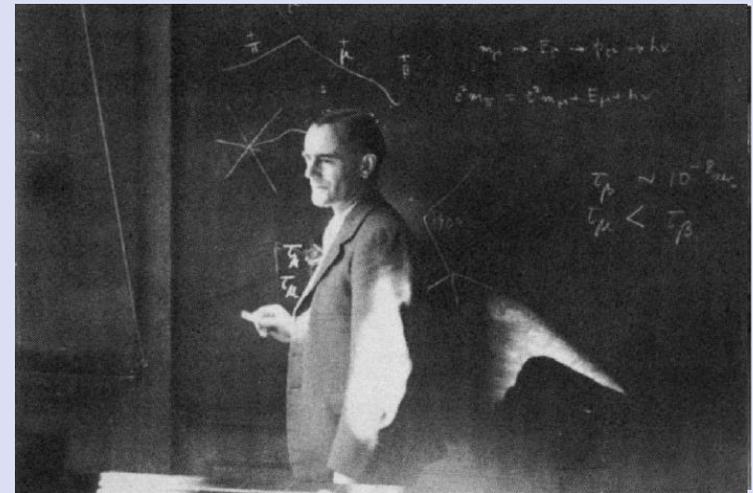


# Particle Physics in Eastern Europe in the 1940s and 1950s...

In the Eastern bloc countries, nuclear physics started already before the Second World War; theoretical physics had been on especially high level; in-between Russian physicists one could find several Nobel Prize laureates: N.G. Basov, P.A.Cerenkov, I.M. Frank, P.L.Kapitsa, L.D.Landau, A.M.Prokhorov, I.E.Tamm ....

The Second World War left universities and institutes of Eastern Europe highly devastated... And, because „socialisation” was imposed, number of physicists left the countries and moved to the West... The experimental particle physics was oriented on cosmic ray studies...

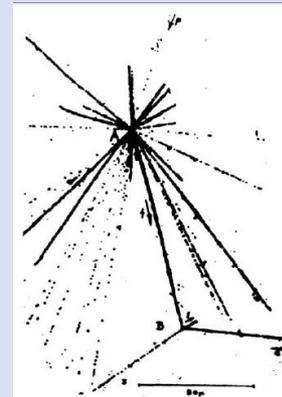
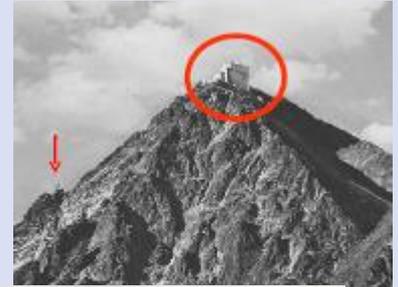
In **1947**, in Krakow, Poland, the **1-st Int. Conference on Cosmic Rays (IUPAP)** was organized, gathering a number of well-known physicists: P.Auger, G.Bernardini, P.Blackett, J.Clay, M.Cosyns, L.Leprince-Rouget, L.Janossy, W.Heitler, A.Wheeler, **C.F.Powell** ...  
- at this conference he announced the **discovery of  $\pi$ -meson...**



# Particle Physics in Eastern Europe in the 1940s and 1950s...

Cosmic rays physics brought several exciting discoveries already before the Second World War... The experiments could be, in principle, conducted in any country... Physicists flew balloons, climbed mountains or descended to mines, to establish their laboratories there... French, Italians and Swiss, others - in Alps..., Bulgarians, Czechs, Slovaks, Hungarians, Poles, Romanians and Russians in the Rila or Tatra Mountains, Caucasus, Pamir...

Collaborations with foreign universities were the sources of experimental materials; Bristol shared emulsions with Moscow, Warsaw, Budapest, Prague, Krakow, Zeuthen.... In 1952 the Warsaw group, lead by **Danysz** and **Pniewski**, discovered new physics phenomena: **Hypernuclei!**



# Particle Physics in Eastern Europe in the 1940s and 1950s...

In the USSR the situation was different as the government recognized the importance of atomic energy for peaceful and military applications...

Following the suggestion of **I.V. Kurchatov**, in **1946** it was decided to build a proton synchrocyclotron of **500-700 MeV**. As the location a small village Novo-Ivanovo lying at the bank of the Volga river, 120 km north of Moscow, was selected by... **L.Beria**... And it was him who directly supervised the project...



The laboratory was called „Hydrotechnical Lab of the Academy of Sciences”; originally it was headed by **I.V. Kurchatov**, later by **M.G. Mescherakov** and **V.P. Dzeleppov**... The synchrocyclotron started to operate in Dec. 1949, to mark the 70th birthday of **I.V. Stalin!!!**



Until **1954** the Soviet scientists had not been allowed to publish results of their developments and studies!!... – Western physicists were highly surprised what they saw, when visiting Ivankovo in 1954...



# The origin of JINR Dubna...

Years later on, at the occasion of the 40th Anniversary of the Dubna Institute (1996), A.M. Petrosiants, the Soviet representative to JINR, confessed: „At the top political level of the Soviet Union the idea was to make a counter-weight for CERN...”.

In March **1956** the representatives of socialist countries visited the laboratories of the Academy of Sciences in Novo-Ivankovo. On 26 March 1956 in Moscow they signed an agreement to create the Joint Institute for Nuclear Research, JINR, Dubna. In addition to the existing laboratories of the **Nuclear Problems** and **High Energy Physics** it was planned to develop three other laboratories: **theoretical physics, neutron physics and nuclear reaction physics.**

**D.I. Blokhincev** (USSR) was appointed the first Director of JINR, with **M.Danysz** (PL) and **V.Votruba** (CZ) as his deputies.

In **1957**, JINR was registered in the UN International Organization register under the number # 3686.



# Coming to Dubna...

Dubna is situated about 120 km from the Sheremetevo airport, and usually an institute car was sent to bring visitors... It was a strange feeling to see big ships moving through the forests... – as they were on the Moscow-Volga canal... Dubna looked as a recreation place: small cottages in the park at the bank of the Volga river... laboratories in the forests...

In the 1970s JINR Dubna employed about 6500 people, out of which about 2500 were scientists, engineers and technicians, including about 300 from the Eastern European Member States...

For foreigners there were some privileges but also... „constraints“... We could travel to Moscow (but no stopping on the way!) and within 15 km radius out of Dubna... Special permissions were necessary to go for touristic or scientific trips, and we had to use „Inturist“ travel agency...



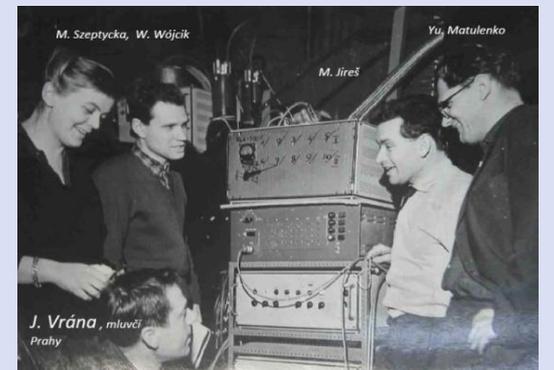
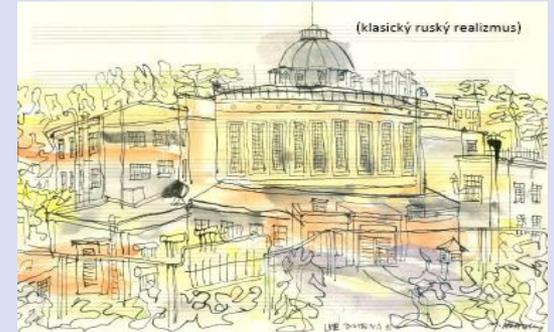
# High Energy Physics in JINR Dubna...

In spring **1957** the Synchrophasotron was put into operation – it accelerated protons up to 10GeV - those days the highest energies...

Some people called the Synchrophasotron the „tsar accelerator” ... – the other „tsars” were: „tsar pushka” (gun) and „tsar kolokol” (bell), both in Moscow at the Kremlin...

First experiments with the participation of the physicists from the Member States were done at the Synchrocyclotron and Synchrophasotron using emulsions, which partially were analyzed by the participants in their home laboratories... Gradually, bubble chambers and electronic techniques were introduced...

Towards the end of the 1980's a superconductive synchrotron was built and now beams of light nuclei, up to sulphur, became available...



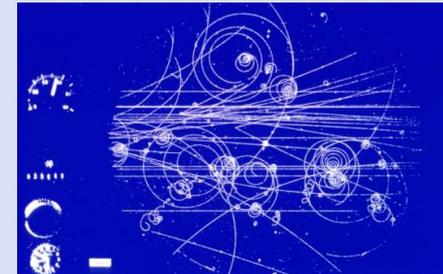
# CERN - Eastern European countries - first contacts...

The scientific ties between JINR and CERN date back to **1957**, when JINR Vice-Director, **M.Danysz**, visited CERN and discussed with CERN DG **C.J.Bakker** the exchange of scientists...



Visits of JINR and CERN scientists were supported by their home laboratories; however also grants (e.g. Ford, IAEA, etc.) or „travelling fellowships” were available...

First visitors were from Poland and came to CERN in **1958/59**; then other Eastern European countries followed (USSR, JINR, Czechoslovakia and ...GDR...); CERN people were re-visiting Russian/JINR labs in exchange...



Theoreticians were welcomed at the CERN Theory Division by **J. Prentki**... Experimentalists joined bubble chamber groups of TC Division, lead by **Ch.Peyrou** – those visits often lead to long term collaborations...



Some visitors were interested in new accelerator and experimental techniques....

# Eastern European countries - attempts to join CERN...

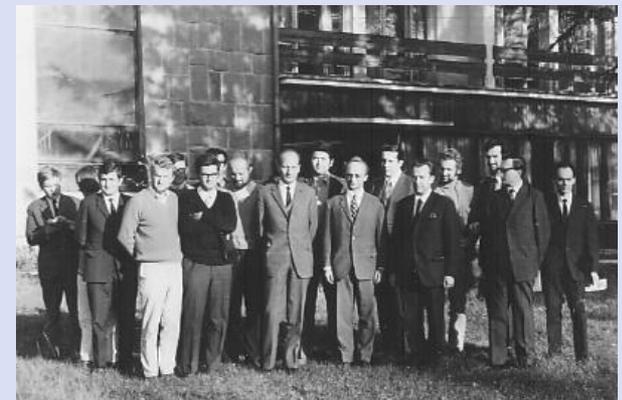
At the beginning of the 1960s the number of Polish visitors at CERN was second to Americans...

The quality of physicists from Eastern Europe was acknowledged and the CERN DG, **V.Weisskopf**, invited Poland to join ... But the Yalta agreement was still in power... However in **1964** the Polish Office for Atomic Energy managed to get permission for Poland to become an observer in the CERN Council...

The Finnish government had contacts with CERN and the cooperation agreement was signed in **1968**.

In the mid-1960s theorists from Bratislava, Budapest and Vienna (**W.Thirring**) started to organize regular „triangle collaboration” meetings of Eastern and Western physicists...

In **1968** Czechoslovakia was discussing associate membership with CERN – talks were interrupted by the „friendly” invasion...



# Institute of High Energy Physics in Protvino...

In March **1958** the government of the USSR took a decision to create a new Soviet centre for high-energy physics on the bank of the Protva river, near Serpukhov... In **1963** the Institute of High Energy Physics was created under the leadership of **A.Logunov**; the staff consisted of experienced scientists and engineers from Dubna, Moscow and Kharkov. In **October 1967** proton energies in U-70 reached **76 GeV**, with **B.Gregory** present...

An agreement on scientific collaboration between IHEP Protvino and JINR Dubna was signed in **1966**

In July **1967** the agreement on scientific and technical co-operation between CERN and IHEP Protvino was signed with the Soviet State Committee on the Utilization of Atomic Energy – the program included the design and construction of **fast extraction system** and **RF separator**, as well as preparation and execution of **joint experiments**.



# Collaboration

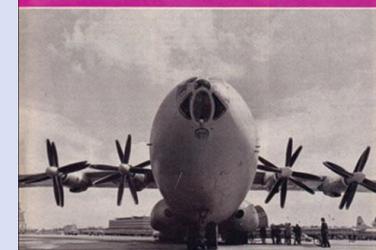
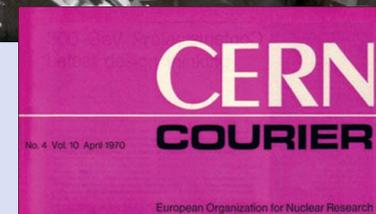
## CERN-IHEP Protvino...

In the period from 1968 to 1976 CERN contributed to several experiments at IHEP Protvino.

The first joint experiment was the measurement of the yield of the secondary particles in the range of 40 to 70 GeV; the second phase was to study the dependence of total cross sections in hadronic interactions – its rise with the energy was called the „Serpukhov effect” ...

The second experiment was done using a large CERN-IHEP boson spectrometer – the equipment, excluding 110 ton magnet (shipped separately by train), was transported from Geneva to Moscow by the largest Russian cargo plane, AN-22, causing a lot of concerns at the airports...

CERN contributed to the construction of U-70 beam lines providing fast extraction systems and RF separator.



# Collaboration

## JINR Dubna-IHEP Protvino...

In one of the first experiments of Dubna physicists at IHEP the nuclei of anti-tritium was discovered...

In 1969-71 the team of JINR-UCLA-IHEP measured  $n$ - $e$  and  $n$ - $p$  small angle scattering using a magnetic spectrometer with spark and proportional chambers – they were used for the first time for triggering...

The following years several spectrometers were constructed and used at IHEP Protvino (BIS, CHARM, BIS-II, MIS, EXCHARM, HYPERON, SIGMA-AJAX, RISK and other) allowing for various physics in the energy range up to 70 GeV/c. Challenging studies on using crystals for beam bending were made by the Dubna team.

Altogether several dozen of joint experiments were performed in 20 years, with the participation of physicists from Bulgaria, Czechoslovakia, GDR, Finland, Hungary, Poland and Romania, as well as from several Western laboratories (e.g. Italy, USA...).



# Coming to CERN...

For physicists from the Eastern countries CERN was a place to visit and to work there...

Experimental facilities were very impressive and organization was effective: paper, pens, electronic components, computers, etc. were easily available; formalities were minimal and done quickly... A kind of „paradise“ - especially if one looked around...



However, for „Easterners“ it was not easy to enter this „paradise“... The passports were in the hands of local authorities, who handed them only to „trustworthy“ people... There was also a problem of financing, as the Eastern currency was not exchangeable!, and laboratories had only small amount at their disposals... Fortunately, many **Western institutions** understood the problem and they **offered us financial support** (CERN, RWTH Aachen, NIKHEF Amsterdam, LAPP Annecy, U.Heidelberg, U.Helsinki, MPI Munich, CEA Saclay, HEPY Vienna, ETH Zürich...) – **we thank them all.**

We were also getting lessons on the „citizen society“, e.g. how people protect their environment and decide on local matters...

# Common East-West experiments at CERN...

In the 1960s and 1970s, a number of groups from Eastern Europe (Helsinki, Krakow, Prague, Warsaw) were involved in bubble chamber experiments at PS and SPS – physicists took part in runs at CERN and measured and analyzed films at home...

The end of the 1970s marked active participation of Eastern European physicists in electronic experiments at CERN ISR and SPS: SFM, WA3, CDHSW... People from Eastern laboratories (Dubna, Krakow, Prague, Warsaw, etc....) learned how to contribute and share their knowledge of physics, experimental techniques and computing skills.

The first joint CERN-JINR (Berlin, Budapest, Dubna, Prague, Sofia) experiment NA4 was prepared under a special agreement between CERN and JINR (1975).



# Common East-West experiments at CERN...

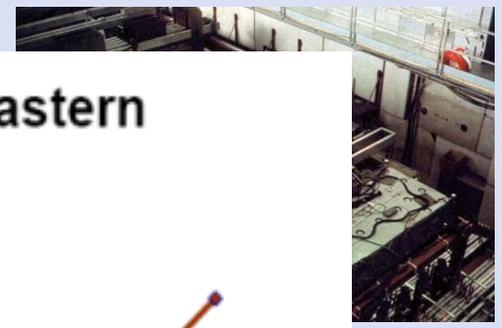
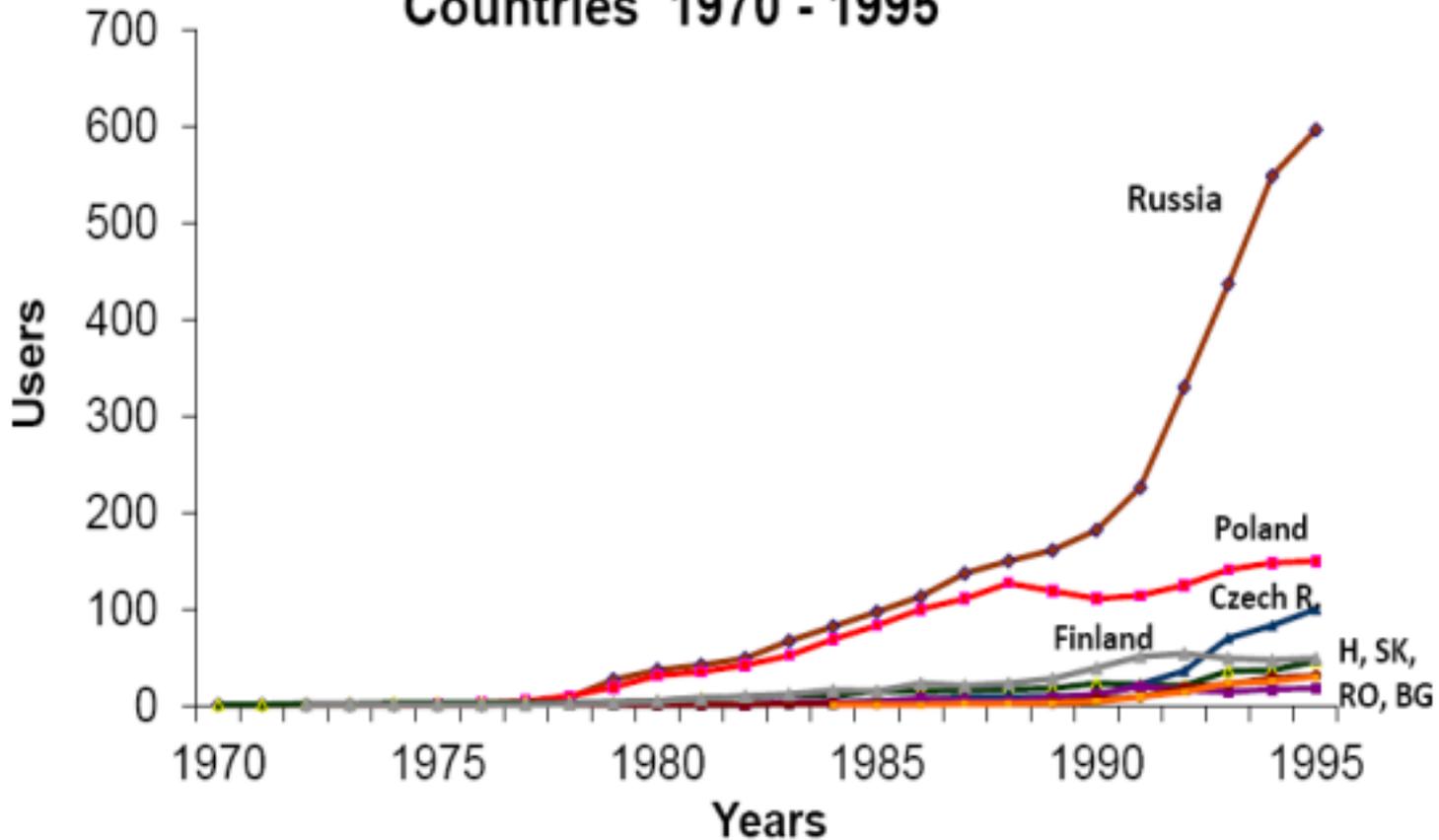
A significant increase in the number of visitors from the East to European countries at CERN users.

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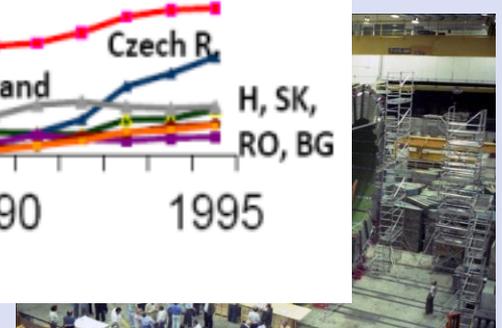
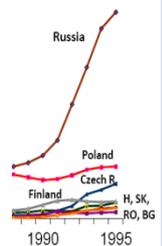
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## CERN Users and other Associates from Eastern Countries 1970 - 1995



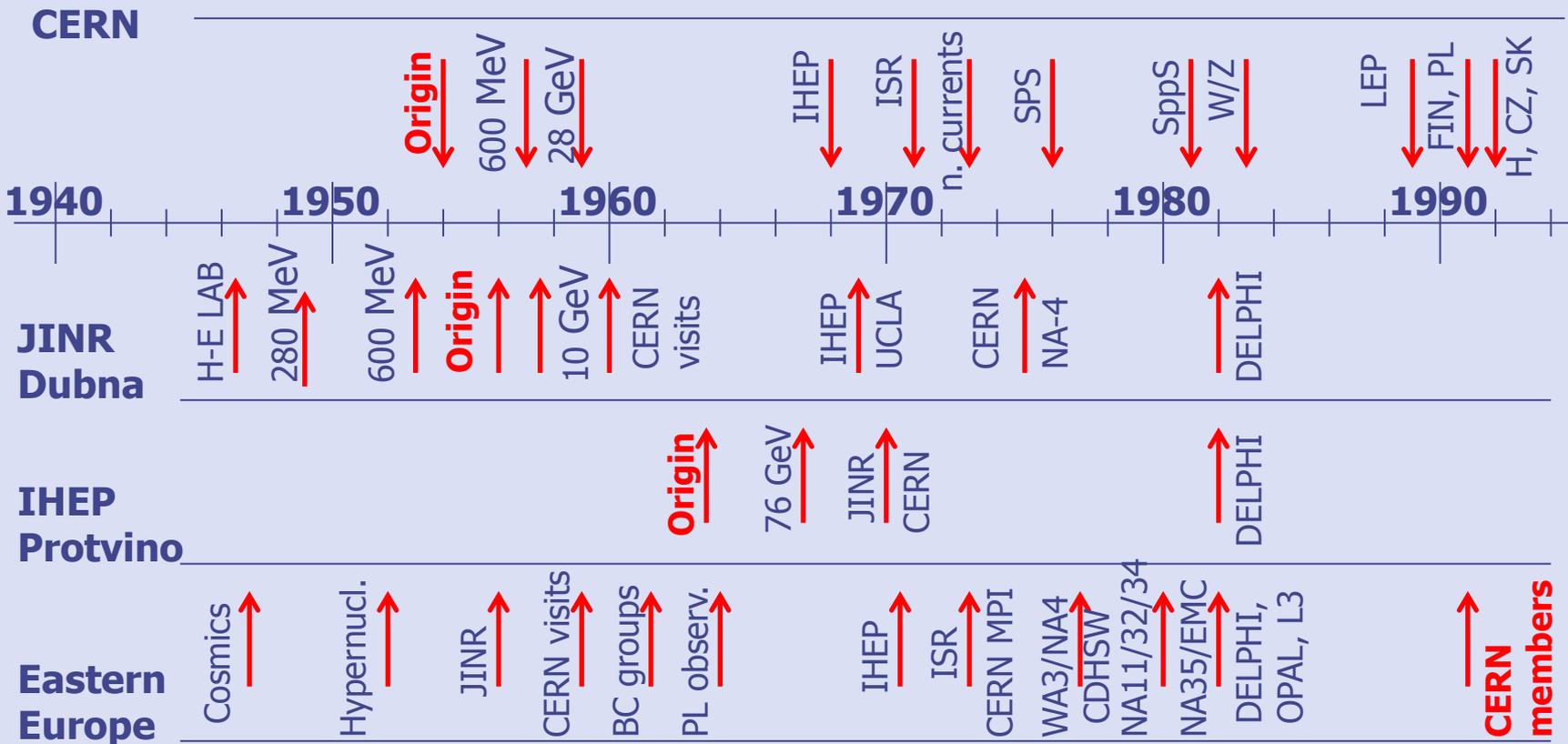
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# Timeline...

## CERN–JINR Dubna–IHEP Protvino–Eastern Europe

The timeline, or a „patchwork”, of those „45 years” (1947 -1992) is quite complicated... Perhaps later it will help you to follow the history...



# Friendly contacts and discussions...

The importance of friendly contacts and informal discussions between people was recognized at CERN right from the beginning... Therefore, the CERN cafeteria is one of the most important places in Particle Physics...

More formal presentations and discussions took place at the conferences... There were many meetings of this kind; however, not everyone could participate in these events, if they were organized in the West... The problem could have been overcome if conferences and workshops had taken place in Eastern countries, which was often the case...

One should not neglect the importance of private meetings of scientists working together, group dinners, wine and cheese parties, sport activities, etc..., which helped to built-up long-life professional and private friendships...



# Education and Outreach...

Right from the beginning CERN recognized the importance of training young people by the top level experts in the field. This recognition led to the organization of summers studies at CERN and the International Physics Schools – from **1970** onwards, they were organized together with JINR (the first such school was organized in **Finland**).

In addition to CERN-Dubna physics schools in the Eastern European countries each year there were other events of this kind in: Alushta, Baku, Herceg Novi, Ushgorod, Varna, Kazimierz, Zakopane, etc., at which one could meet physicists from East and West, and learn fundamentals of particle physics and latest news from experiments.

Since years CERN became a visit point on the map of Geneva . Two exhibitions, „**Microcosm**” and „**Universe of Particles**”, are available at the CERN site and special „open days” are organized yearly...



# **Social life on both side of the Iron Curtain...**

The Iron Curtain was present at high political levels for a long time... However, there was no problem in finding common language and mutual interests between physicists and engineers, independently of their nationality or scientific experience – at CERN students could have their breakfast with Nobel prize laureate..., at JINR Dubna the „club of scientists” organized cultural evenings and discussions..., at IHEP Protvino Russians played basketball with Americans...

The people on both sides of the „Iron Curtain” had similar hobbies: playing music, paintings, racing, hiking or climbing, sailing, skiing, etc... – such activities helped to establish common understanding... There were also some obstacles; however with some initiative and good will of the people concerned they could be overcome...



# Attempts to pull down the Iron Curtain...

From time-to-time the Eastern Block was shaken by unrests. The first were workers' riots in **East Germany** in **1953**. In June **1956** workers went out on streets in **Poznan, Poland**. In **October 1956** the **Budapest revolution** erupted and it was suppressed bloodily by the Russian army. The **Prague Spring of 1968** was terminated in August by soldiers of the Warsaw Pact.

The Polish protests continued in **1970** and **1976**. In **1980 „Solidarność”** was born in **Gdansk** and soon it changed to a national movement, attracting 10 mln. people – it was suppressed for years in **1981** with the communist government's „martial law”...

In the 1980s several people played an important role in „pulling down the Wall”: **John Paul II, L.Walesa, M.Gorbatshev, R.Reagan, M.Thatcher...** In **1983** John Paul II visited CERN and met with DG H.Schopper and other physicists...



# CERN

## - human rights and humanitarian aid...

In **1978** the **Orlov Committee** was created by a group of CERN physicists (U.Amaldi, G.Charpak, D.Möhl and others) with the purpose of helping colleagues subject to prosecution for their actions in defense of human rights. The Committee demanded the liberation of Y.Orlov, N.Sharansky and A.Sakharov in the USSR, but also of Polish physicists interned during the „martial law” period (A.Chelkowski, L.Turko, M.Zralek).



CERN people are sensitive to natural and political disasters, poverty, lack of basic education, medical services or other supplies... In **1982**, when the „marital law” was introduced in Poland, several CERN physicists and their wives (V. Chabaud, R. Klanner, G. Nassibian, P.Weilhammer and others) established a humanitarian organization „**Assistance Pologne**”, which over two years collected few tons of basic medical equipment and medicaments, and sent them to Poland, with the support of the CERN DG H.Schopper and the Polish airlines LOT...

# Eastern European countries - the Velvet Revolution...

Probably, at the end of the 1980s nobody expected that the end of the communist period is on the horizon...

In **March 1989**, in Poland, the round table discussions between the government and the opposition took place. It was agreed to legalize „Solidarność” and to organize on **4th July** a semi-free election 30% of the parliament members – the results were striking: all seats were taken by the opposition! And in **September 1989** Poland had a democratic government!!!

The domino effect started:

- In **June 1989** in Berlin millions of people started demonstration, the Wall was destroyed in **November**, and in **1990** unification of Germany started,
- Czechoslovakia changed its government in **November-December 1989**,
- Romanian people abolished their communist government in **December 1989**,
- Hungary changed their governing system in **1990**.



# Eastern European countries - joining CERN and hoisting the flags...



And finally it was happening... – the Eastern Europeans started to join CERN, one-by-one...

It was not automatic, as the candidate country had to convince their local governing bodies, scientific and political, about the advantages of joining CERN... And CERN wanted to check that the country in question concerned fulfilled scientific, political and economical criteria...



Following the unification **East** German physicists acquired CERN rights in **1990...**

**Finland** joined CERN on **1 January 1991...**

**Poland** joined CERN on **1 July 1991...**

**Hungary** joined CERN on **1 July 1992...**

**Czechoslovakia**, as the Federation, joined CERN on **1 July 1992**; **Czech and Slovak Republics** were admitted on **1 July 1993...**

**Bulgaria** joined CERN on **11 March 1999...**



# **CERN - Science and Peace...**

**In spite of strong political background, there was never any East-West confrontation in science, but friendly collaboration and competition...**

**CERN demonstrated that mutual goals could unify the people and that financial constraints could be overcome....**

**Working together showed, once again, that we are all similar in our intellectual abilities and manual skills...**

**Starting in the 1970s the Eastern European countries were treated as partners and they contributed significantly to the CERN program...**

**CERN has unified not only Europeans, but also people from other countries and continents... (the nationalities of the CERN Users demonstrate it best...).**

**CERN became a model for 7 other European International Research Organizations (EMBL, ESA, ESO, EFDA JET, ESRF, European XFEL, ILL).**

# **Thank you, CERN...**

**... for excellence in science...**

**... for openness and collaborative spirit...**

**... for demonstrating “the small Europe” principle...**

**... for excitements in my life...**

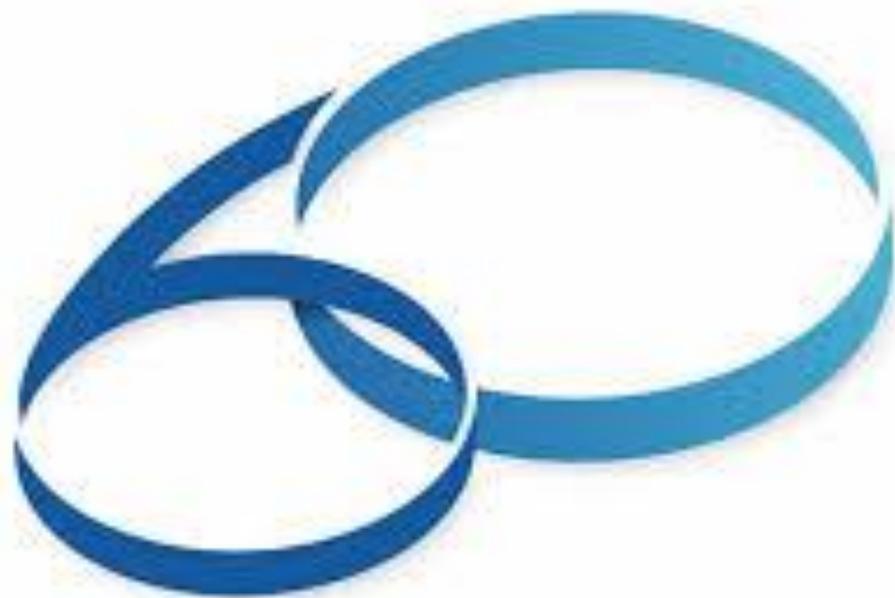
**Happy Birthday, CERN**  
**- we are now waiting for your**  
**100th Anniversary!**

**And Thank You All  
for  
your attention...**

**Many people helped me to prepare this talk, kindly providing me with their presentations, information or photos – I thank all of them:**

**J. Äystö, J.Bartke, A.Bialas, C.Brandt, D.Chromek-Burckhart, J.Fischer, M.Haiduc, J.Hladky, V.G.Khadyshevsky, T.Kurtyka, R.Leitner, P.Levai, W.Lohmann, P.Malecki, V.Matveev, S.Myers, J.Pisut, J.Ridky, I.Savin, S.Schmeling, J.Sebesta, V.Simak, S.Sitar, R.Sosnowski, J.N.Stamenov, T.Stange, B.Starchenko, J.Tuominiemi, G.Vesztergombi, R.Voss, A.Cybulska-Wasilewska, H.Wenninger, W.Wolter, A.K.Wróblewski, A.Zaitsev, V.Zamfir**

**Some information and photos have been taken from the CERN Archive, CERN Courier, CERN 75-7 Report by W.O.Lock, Studies in CERN history by D.Pestre (1984), The birth of CERN by F.deRose (1951), JINR web pages, IHEP Protvino web pages, Women in Science by S.Baudia; and books: „CERN –A photographic record 1954-1979” (CERN 1979), „Infinitely CERN” (CERN and Ed. S.Hurter, 2004) „Dubna – an Island of Stability” (Dubna 2006), „Orbits of cooperation” (Dubna 1987), booklet „Science Bringing Nations Together” (UNESCO, 1998), „Poland at CERN” (Krakow 2004); and also from my private collection.**



YEARS/ANS **CERN**