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# Triangle collaboration

## (1) Introduction

In this contribution we would like to inform briefly about so called Triangle collaboration — collaboration between Central-European institutes in field of elementary particle physics. History of Triangle collaboration is very nice example how connections between East and West started and developed in weighty time of divided Europe.

## (2) The beginnings of the collaboration: 1964–1967

First step to establishing contacts were done in 1964. One of the pioneers of this collaboration Prof. Walter Thirring jr. (Institute of Physics, Vienna University) informed me that his father Prof. Walter Thirring senior at that time disposed with money from Ford foundation and he used it for financial supporting of contacts with East European states. On the other hand in Czechoslovakia was in the late 1960´s more favourable situation for entering to relations with foreign institutions. Therefore it was possible to start regular contacts.

So during Rochester conference on elementary particle physics in Dubna in 1964 Walter Thirring jr. had contacted his Slovak colleagues — theoretical physicists from Bratislava, namely Dr. Milan Petráš (Comenius University) and Dr. Mikuláš Blažek (Slovak Academy of Sciences). They have agreed to start contacts between Vienna and Bratislava.

First concrete step was done in next year of 1965. It was invitation for Slovak colleagues to take part in Fifth International Winter School on Nuclear Physics in Schladming in February 1966. There rose idea to make reciprocal step — to invite Prof. Thirring to Bratislava. He dropped on Bratislava in May 1966. In the Institute of Physics Slovak Academy of Sciences he lectured on triplet model of elementary particles. This visit was very important for the development of collaboration between Austrian and Slovak theoretical physicists because in discussion after the lecture they decided to make an agreement on a systematic collaboration. But later Slovak and Austrian physicists came to understanding not to sign any official treaty in order to realize more simply reciprocal visits. This principle was applied later for all time of existence of Triangle Collaboration.

We have to point out that at that time it was not simply for Austrian citizens to visit Czechoslovakia. They needed special license. On the other hand for Czechoslovak physicists an special invitation was necessary for obtaining travelling passports and afterwards applying for license. So until the end of 1966 only some people from Bratislava visited Vienna and vice versa only some physicists from Vienna visited seminars in Bratislava. In spite of it reciprocal visits gradually became regular in spring of 1967.

In autumn 1967 Prof. Walter Thirring offered to Hungarian physicists to take part in the collaboration between Vienna and Bratislava. Budapestian colleagues — both from Academy of Sciences and Lóránd Eötvös University were interested in joining the Vienna — Bratislava seminars. Prof. G. Marx wrote in October 1967: “We hope some of the common seminars will be held in Budapest.” We must add that it was not the first contact between Hungarian and Austrian theorists. In Prof. Thirring´s correspondence we have found the letter from year of 1964 in which they invited each other on various meetings. Hungarian physicists met with the same problems as Czechoslovak colleagues — namely with visa formalities. No wonder. They belonged to the same “camp”. However they succeeded in solving all problems at the end of 1967.

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## (3) The first triangle meetings: 1968–1969

The first lecture which might be called "triangle" took place in June 1968 in Bratislava. Prof. G. Marx held a lecture entitled Recent progress in CP-violation. Inverted marks were used because this name — triangle — for joint meetings of physicists from Austria, Hungary and Czechoslovakia arose later. Otherwise things were taking their normal course: Slovak theorists visited 9 seminars in Vienna and 6 seminars were held during spring semester 1968 in Bratislava.

Although before summer holiday 1968 partners sent each other invitations for the seminars in next semester, politicians decided in another way. After occupation of Czechoslovakia in August 1968 joint seminars became more rare because Slovak physicists had not opportunity to travel to Vienna regularly.

It is very interesting that namely during this bad and weight time the name "triangle" for joint seminars was born. The author of name was Prof. Herbert Pietschmann who has became the chief of Institute of Theoretical Physics at Vienna University. He substituted at that position Prof. W. Thirring who had moved to CERN.

While on August 1968 Czechoslovakia was occupied by the forces of five states, among them Hungary too, Austrian physicists refused to take part in the common conference in Hungarian town Keszthely in order to demonstrate their denying to the occupation. However, simultaneously Prof. H. Pietschmann had phoned to Prof. Marx and had explained to him their motivation. After that, how recollected both Prof. Marx and Prof. Pietschmann, they mediated how to improve so bad situation and they came to agreement to organize common seminar in Vienna on December 1968.

During this meeting Austrian and Hungarian physicists decided to call their meeting "triangle", inspite of Slovak colleagues were absent. In this way they protested against the occupation of Czechoslovakia.

Prof. Pietschmann narrated that he proposed the name "triangle collaboration" because during his stay in USA he liked the collaboration of three American universities, namely Chappel Hill University, North-Carolina University and Durham University which are situated hereabouts — as Bratislava, Budapest and Vienna are — and they successfully collaborated through informal relations without any official treaty.

A few joint meetings took place in 1969, the first year after the occupation. In June Dr. Saxl from Vienna held in Bratislava lecture entitled Theories of Gravity. Five his colleagues from Vienna took part in seminar too. In October traditional Colloquium on Elementary Particle Physics was held in Bratislava. Six physicists from Austria and 11 from Hungary took part in this meeting. Besides that Prof. Kastrup from Munchen and Dr. Weiner from Bucharest took part in this meeting as guests.

In spite of bad political conditions physicists from SAS took part in several seminars in Vienna. About these visits it is written in archives of SAS: "Participation on these seminars is very helpful for our participants and helped them partially to get over the feeling of isolation."

## (4) A breakthrough in collaboration: 1970

The year of 1970 we can consider as a breakthrough in collaboration. Firstly, during this year more joint triangle seminars were held than during 1969. Secondly, Colloquium on Elementary Particle Physics became "turning point" in development of triangle collaboration: although it was a part of regular series of triangle seminars, except traditional participants from Austria, Hungaria and Slovakia their colleagues from GDR and Yugoslavia took part in that Colloquium. Besides that there were at first experimental lectures. Thirdly, Colloquium left Department of Theoretical Physics Comenius University in Bratislava and started to "domesticate" at Smolenice castle near Bratislava. Fourthly, organizers started to publish the lectures held at Colloquium — namely in special volume of Physical Journal of SAS.

## (5) A normal course: after 1970

So much about origin of triangle collaboration. After 1970 it was taking normal course for three decades. We could summarize the main characteristics of triangle Collaboration:

1. Until 1970 there were "pure" Triangle collaboration Bratislava — Budapest — Vienna: joint seminars organized by Slovak, Hungarian and Austrian physicists subsequently. Previously, theoretical problems of high energy physics have been discussed there. Later frequency of the common seminars was increasing and there were about one meeting per month. But during the 1980's one

informal seminar took place only. So this form of triangle activities are becoming an exception both at late 70's and at 80's.

2. After year of 1970 the institutes from other cities have joined the "triangle towns". So "extended" or "regional collaboration" originated comprising "all institutions of similar scientific interests within an area that follows for communication within about one day of travel by car or train" — as Prof. Pietschman wrote in one of his seminar reports. Following towns belong to the regional collaboration: Vienna and Graz (Austria), Budapest (Hungary), Bratislava and Prague (Czechoslovakia), Zagreb (Yugoslavia), Trieste (Italy), Kraków and Warszawa (Poland).
3. Physicists from many "non-triangle" countries were taking part in triangle meetings — either as lecturers or as participants. We counted 18 countries (plus CERN) and 40 towns.
4. Experimental lectures became regular part of triangle meetings from beginning of 1970's.
5. Conferences and schools on particle physics have been also organized in the terms of Triangle collaboration.
6. Organizers of triangle meetings have started to publish lectures and short communications presented on seminars, colloquia, conferences and schools.
7. Informal seminars held sequential in Bratislava, Budapest and Vienna are becoming exception during the late 1970's and during 1980's. Instead of it common several-days meetings (seminars, conferences etc.) are organized. Physicists from non-triangle cities are attaching to that events more frequently, first of all as lecturers.
8. Number of towns which were organizing the triangle meetings extended in late 1970's. For example, colleagues from Milan have organized at least one triangle seminar. Besides that Yugoslavian physicists have mentioned even Belgrade as a member of extended triangle collaboration. Therefore, all countries from so called Hexagonal or Central-European Initiative established by politicians in the beginning of 1990´s took part in "regional collaboration" on elementary particle physics. One can say: physicists have started to collaborate two decades sooner than politicians.
9. Step by step "typical" triangle meetings were formed: summer schools in Yugoslavia at the end of August and during the September (Adriatic meetings), symposium in Visegrad (or Matrafüred) in Hungary in late September, conference *Hadron Structure* in Slovakia on October or on November and finally, so called Advent meeting in Vienna — when November turns in December.
10. There were pure experimental meetings during the late 1970's and during 1980's and share of experimental lectures was increasing and spectrum of topics was becoming wider.
11. Unfortunately, there were problems in 1980's. For example, flow of financial support from official authorities was very unstable an that period. So members of triangle collaboration were obliged to use various sources for financing their activities. Slovak physicists could not attach the triangle seminars regularly, namely theoreticians from Comenius University did not participate Vienna meetings until years of 1988.

To characterize two decades of Triangle collaboration I would like to cite from little note on 20$^{th}$ anniversary of triangle activities which was published in CERN Courier in 1989: "From its modest beginnings, it has become an important east-west bridge."

After so called "velvet revolution" on November 1989 situation had changed dramatically. We could visit all event in Vienna and other foreign cities. During 1990's traditional events were organized — I mean conference *Hadron Structure* in Slovakia, Advent triangle seminar in Vienna etc. New forms of collaboration and new events hade arisen. For example summer schools and workshops for young students and PhD students. Several social events were prepared — for example Comenius University awarded Prof. W. Thirring by title honoris causa, and Prof. G. Marx by the Gold medal of Comenius university. Austrian colleagues have organized very nice symposium in Honour of Boltsmann's 150$^{th}$ Birthday etc.

## (6) Conclusion

As a conclusion I would like to say few words about importance and usefulness of Triangle collaboration.

- Firstly, for Slovak and partly also for Hungarian physicists it was one of very little opportunities for personal contacts with foreign colleagues, for obtaining new information and presenting scientific results.
- Secondly, common papers and projects arose, for example so called Pension-Astra-Collaboration Jankovác, Patkós, Kajantie and many-many other.
- Thirdly, young theorists spent weeks, months and even years in collaborated institutions. It was very useful experience for them and good start for their professional career. I would like to mean study stages of Slovak students V. Černý in Budapest under supervision of Prof. Kuti, Š. Olejník in Kraków (supervisor Prof. Białas) and M. Mojžiš in Vienna (supervisor Prof. Eckert).
- Fourthly, during triangle events we have exceptional opportunities to see and hear great physicists — Jack Steinberger, Carlo Rubbia, George Charpak, Roman Jackiw, John Stewart Bell, Richard Dalitz and even young Andrej Linde.
- Fifthly, Triangle collaboration gave to grow *Erwin Schrodinger's International Institute for Mathematical Physics in Vienna*.

## (7) Acknowledgements

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