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25 YEARS OF MULTIPARTICLE DYNAMICS SYMPOSIA

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Abstract

The story of the series of Multiparticle Dynamics meetings is told on the occasion of the 25th Symposium. They began with a dissatisfaction with the big conferences which neglected the area of physics which dealt with low transverse momentum events and basic problems such as hadronisation. The changes in physics over these 25 years is reviewed - originally the work was experiment-driven but now it is more theory-driven, since few theories existed 25 years ago. The symposia are run by a group, "the Elders" and the rules for organising meetings are listed. Originally the aim was to hold meetings alternately in Eastern and Western Europe, but lately it has been alternately Europe and elsewhere. It is explained why no meeting was held in 1989. Memories of individual meetings are given - why do we remember more people and happenings rather than physics? The symposia have been judged successful and look to have a good future.

1. The Beginning

In 1969 many people were dissatisfied with the lack of discussion about high multiplicity events and low transverse momentum physics even though more than 90% of events had low p_T . The major annual conferences concentrated on high p_T where there were exciting results that could be interpreted - so it was reasonable. But the hard-to-interpret low p_T results were being neglected. Thus a meeting was organised by a group, in particular R. Lestienne, A. Krzywicki, R. Salmeron, and R. Sosnowski, with encouragement from L. Van Hove (the influence of the strong group of Polish physicists in this subject was already noticeable). This first meeting was held in the old building of the Ecole Polytechnique in Paris. The first problem was the choice of title - finally "Multiparticle Dynamics" was chosen as it could mean anything you wanted - a wise choice as the subject has subtly changed with the years.

The first meeting was very successful and it was felt that there was a great need so that the meetings should be continued annually. From the start the organisers had a social conscience and wished to make the meetings alternate between East and West Europe. It was not possible to arrange things very quickly in the East but as an approximation the second meeting was in Helsinki - then the third in Poland.

2. Organisation - The Elders

The organising body was not planned - it just grew with a group of enthusiasts meeting privately to decide on the next meeting. Gradually it developed a more consistent structure and was composed essentially of those who had organised a meeting or were offering to hold one - as I like to scribble away, was made the secretary. We called ourselves "The Elders" which over 20 years ago was a joke but with the passage of the years, has become somewhat real - though with a new organiser joining each year, there is always fresh blood.

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The meetings are held late at night with some 12 to 15 people attending - and a tradition has grown up that each brings a bottle, usually of whisky (Scotch fortunately). A little is sometimes left over and somehow vanishes next day.

An agenda has developed consisting of four items. Firstly it is asked if the meetings are worth continuing and at least one devil's advocate is always found who says they are a waste of time - so far he has always been successfully argued down. Secondly the current conference is discussed - each speaker usually begins "It is a great conference, but". This is tough on the conference organiser but is extremely useful for the next year's organiser who gets a detailed account of what to do and even more important, what not to do. Thirdly the organiser of next year's symposium presents his plans and is confirmed, and finally proposers of future symposia make presentations which are discussed.

3. Conditions for Symposia

a). There is an underlying social agenda. Initially this was that the conferences be held alternately in Western and Eastern European countries. However after a while it became difficult to find a new Eastern country, but with Prince Malhotra proposing India, we had a re-think and decided that one should roughly alternate between a developed European country and another, preferably one which rarely had international conferences so that younger physicists could attend their first one.

b). The organisation should be run by a single person who would be personally responsible for everything

c). Less than 100 participants

d). There should be only one site where there would be lectures, meals and rooms so that we were together all the time and could discuss and get to know one another properly

e). The meeting should not be held in a big city or major lab (or people may wander off)

f). The subjects chosen should combine continuity (similar themes, e.g. low p_T and innovation (the latest 'hot' topic). Also the organiser could devote a half day to any subject of local interest.

g). Invitation only - but anyone could apply. Every year I check and find that the participants have changed greatly, only 15 to 20% were present the previous year - perhaps because the site changes so widely.

h). In 1973, Andrzej challenged the next year's organiser, Sergio Ratti, to provide "one bottle of wine per person per day". Sergio succeeded and subsequent organisers try to attain this level.

4. Changes in the Physics

At the first meeting in 1970, many results on low p_T , multiplicities, and correlations were given. The data were often interpreted using the concept of L. Van Hove of Longitudinal Phase Space, LPS, where the transverse momentum was considered small and roughly constant so that the important variable was the longitudinal momentum. Complex geometrical shapes were derived and experimentalists were expected to plot their results as dodecahedrons etc. In the 1971 symposia, this is illustrated by a beautiful cartoon of Richard Sosnowski showing two people constructing a complex shape from a

pile of Feynman diagrams and saying "Davayte, Proprobuyem" in Russian and "Lets try it!" in English.

Fortunately this phase has passed and transverse momentum is no longer neglected.

The important thing to note here, was that the work was essentially experiment-driven because no reasonable theory existed. Since then things have greatly changed with the coming of quarks, gluons, QCD and the Standard Model. Also Bo Andersson's Lund Monte Carlo program was the first of many which changed the working style of experimentalists as they can now compare their data with expectations, whereas previously no one knew what to expect. Now the work tends to be theory-driven - a major change.

In the early days the results were mainly of hadron-hadron collisions but then point-like particles, neutrinos, electrons, and muons, were introduced which gave greater accuracy and ease of interpretation. As Dick Feynman said it is the difference between knocking two watches together and trying to guess what is inside by looking at the pieces flying off, rather than probing with a small screw-driver. Now collisions of two point-like particles, $e^+ e^-$ collisions, give even more precise information.

Although there is great progress with the use of structure functions etc. there is still an enormous gap in our knowledge - hadronisation. We have a theory of quarks and gluons inside the nucleus and we have a theory of hadrons far from the nucleus, but the linking up of quarks to give hadrons is not really understood - it is called hadronisation but this really conceals our lack of knowledge. This is one of the justifications of these symposia - to understand hadronisation.

In the early 1970's diffraction, both elastic and inelastic, were hot topics with the mysterious Pomeron as a possible explanation. The three-pion mass distributions gave the A-peaks which were not understood. In the 1971 proceedings there is a cartoon from Oleg Cyzewski whose early death was a great loss to us, of someone wearing a kilt on a horse with a lance in the attack position, charging up a mountain whose three peaks are labelled A_1 , $A_{1.5}$ and A_2 . Now the $A_{1.5}$ is gone and the masses and explanations are somewhat different. But the Pomeron is still around though it is not clear to all that the explanation is really known.

Another major change is that previously the beam particles were simple but now collisions with heavy ion beams are widely studied. The holy grail is to prove the existence of a Quark-Gluon Plasma, QGP. This is proving difficult as it is not clear what signal to expect which would establish it. It is interesting to note that while particle physicists are worrying about the existence of QGP, astrophysicists have no doubts - it must exist in the Big Bang scenario.

5. Symposia Year -by-Year

After Paris and Helsinki, the III symposium (for a touch of class, the numbers are always given in roman) was held in Zakopane where the brilliance and major contributions of the many Polish physicists of Krakow and Warsaw could be recognised. Unfortunately I had to miss the IV and Vth symposia in Eisenach/Liepzig and Pavia, but everyone said they were most successful (especially as Sergio fulfilled his pledge of "one bottle").

I particularly remember the VI meeting in Oxford as Dick Roberts said that the Turf pub was almost unfindable and challenged us to discover it. This was too good to miss and a group of us found it in a very narrow lane. But then a gallant Polish colleague asked the scientific question of how we could convince Dick that we had been there. So the large wooden sign on the ground outside was borrowed and taken back to our college, hiding it as best we could from any policeman's gaze. Our gallant friend thought he had better return it so took it back hurrying through the streets at five o'clock in the morning.

The VII symposium in Tutzing organised by Norbert Schmitz, was in the delightful lakes south of Munich, full of Bavarian charm and hospitality. The VIII meeting at the famous old Alsace village of Kaysersberg was unique as Peter Schublin arranged for all the participants to stay with the inhabitants. Thus Dick Feynman stayed with the village pharmacist. I remember being with a very hospitable family of a school teacher who was strongly against nuclear reactors. In the proceedings are some of the epic arguments between Feynman and a certain Preparata who is now such a forceful and dominant figure among the True Believers of cold fusion.

The IX meeting in Tabor in what was then Czechoslovakia, showed the advantages and disadvantages of a communist regime. In a Prague square, Peter was surrounded by many women and children and his wallet disappeared. After the police were informed by Vlada Simak, three days later a police car drove a hundred kilometres to Tabor, and Peter was handed back his wallet - with nothing missing. After that Peter vanished from high energy physics but reappeared in a major article in the business section of the International Herald Tribune describing him as the king of corn-on-the-cob in Europe - which goes to show that physicists can succeed in business if they wish.

Despite initial worries about leaving Europe, the next symposium in Goa was a great success despite the burning of Bombay airport causing problems which were helped by M.G.K. Menon's chief of protocol who looked after us in Delhi. Many Indians who had never been able to attend a major meeting, were greatly encouraged by it. This initiative of Prince Malhotra greatly helped the cause of High Energy Physics in India. The sudden death of Prince at a conference in Evian was a terrible loss to his friends and to Indian physics.

Eddi De Wolf and Franz Verbeure held the XI meeting in Bruges, a wonderful old town - particularly remember the art museums with Hieronymus Bosch paintings so far ahead of their time. When Bill Shepherd offered to hold the XII meeting in the USA, we were again worried since it did not fit as a country with few international meetings. But Bill convinced us the multiparticle dynamic physics was not discussed enough in the States and indeed we had a good meeting at Notre Dame.

Wolfram Kittel was one of the main stalwarts and contributors to the symposia, so we were not surprised at the high quality of the meeting in Volendam, a "typical" old village on a polder north of Amsterdam. His wife, Suzy, is a great cartoonist (am proud to have one on my wall) and the proceedings are illustrated with her humorous drawings. Jack Gunion and Dick Lander convinced us that we should return to the States and indeed the fresh mountain air of Lake Tahoe was very conducive to vigorous activity (including white water rafting) and discussion (seeing a bear eating from the rubbish bin outside the door reminded us of where we were).

As Bo Andersson was leader of the Lund theorists who have contributed greatly to this series of symposia, it was a pleasure to attend the XV meeting in Lund. However we learnt to avoid student canteens which have just changed hands. Visiting the Kibbutz of Kiryat Anavim in 1985 was an experience. Jacob Grunhaus made us feel welcome and safe with all the stocky men around with bulges in their clothing. The excursion to Massada was exceptional.

To return to Austria where I lived for a while, brought back memories and Manfred Markytan chose a fine isolated site fulfilling all our requirements, at Seewinkel. It is on the shores of the Neuseidler See and we could observe the high border fence running across the countryside and across the lake - fortunately only a memory now.

Igor Dremin organised our first meeting in the Soviet Union which gave us the chance to meet some of the great Russian theoreticians such as Andre Linde, Evgeny Feinberg and Lev Okun. He chose Tashkent which was very different from our previous sites. The excursion took us to Samarkand, one of the most impressive cities in the world with its blue-tiled mosques and houses. At the tomb of Tamurlane, the local guide explained that an ancient prophesy was fulfilled when the Great War began on the 22nd June 1941. The Polish people present were too polite to mention that they thought it had already started in 1939 - on being informed, the local guide had a look of sheer incomprehension.

Jean Tran Thanh Van is a great conference organiser and he and Dominique Schiff really succeeded in almost overwhelming us in Arles. The dinner in the chateau of Tarascon stays in our memories.

There was no meeting in 1989. This was our most difficult time. The symposium had been scheduled for Wuhan and we were pleased that we could have it in China as we felt a little bit like missionaries holding the meeting away from the major centres. Most had their visas when the events in Tienamen Square occurred. A few wanted to continue, most wanted to postpone or cancel. The Emails flew and there were many opinions as to what actually to do. In CERN, I consulted Andrei Sakharov and Yuri Orlov. Finally we decided not to hold any meeting that year and Dietrich Wegener helped by volunteering at short notice, to hold the 1990 meeting near Dortmund. It was held in the woods and was pleasantly isolated. We shared the site with a religious group and after a while persuaded them that we had many types of beliefs and would prefer not to be exposed to only one. At the Elders meeting there was a debate after Liu Lianshou asked to hold the next meeting in Wuhan. Finally it was considered that he and his colleagues should be helped. Everyone had adventures reaching Wuhan, but once there, we were impressed by the calm of the gardens where the meeting was held. We felt that we had helped the many Chinese scientists who could attend. The official tour afterwards was on a boat through the Three Gorges which are planned to be drowned when a huge dam is built - it is wiser not to ask the travellers if they liked frogs.

Many had long wanted to visit the pilgrimage town of Santiago de Compostela and indeed it is a unique town. Carlos Pajares had arranged a magnificent programme both for physics and to show us his town. The XXIII meeting was held in Aspen which is Martin Bloch's favourite place. With Alan White and Jorge Morfin, he arranged a fine meeting with a wee bit more small angle physics which had been missing from previous symposia. Again the mountain air was conducive to clear mental activities. Last year's meeting was held in Vietri sul Mare and Alberto Giovannini, who had been active in

multiparticle theory for many years, overcame many difficulties to hold a very worthwhile symposium. The excursion to Herculaneum and the ascension of the Vesuvius volcano were outstanding.

Now we are here at the invitation of Ladislav Sandor at the start of the XXVth symposium in Stara Lesna in Slovakia with the background of the impressive Tatra mountains. All the signs are it should be another good meeting (and it was).

6. Conclusions

Quarter of a century - it flew past so quickly, we were so busy. Yet great changes have happened in physics in that time. While we understand much more, some of the most simple questions in multiparticle dynamics such as hadronisation, are still unanswered and new questions such as the quark-gluon plasma, have appeared. Thus I expect this series of symposia have a need to continue, though I trust the Elders will continue to question everything including whether one should stop if the situation should change and things are understood.

As part of my task as secretary of the Elders meetings, I ask newcomers at the end of the symposium, if they have found the meeting worthwhile. Am pleased to report that almost invariably, they reply that they found the meetings very useful and different from other conferences. They hear details of multiparticle processes that they are working on, but for once they are adequately discussed in the lectures, unlike other conferences. Also the fact they are living in an isolated site, means that they have time to discuss in detail, various points of physics and get to know other people and make lasting friendships.

Changing the organiser and the site every year, allows many new people to attend each year. Maybe in the previous section, the excursions have been mentioned too much, but each new organiser tries to do better and the excursions have been of a very high level. They are a common memory of the participants and a half-day away, allows a breathing space before plunging into a new series of lectures and discussions.

The symposia have been a very useful contribution to the subject and have helped it to advance. But there is also a social aspect where many people have been able to meet others with similar interests, in other parts of the globe and this also has had a positive effect.

My overall "conclusion" is a difficult one since it is a non-conclusion. In recalling all the symposia, there were many good and worthy things. But what I remember best is the times when we misbehaved - like "borrowing" the pub sign in Oxford. It is the problem of parents who tell their children to behave and do well, but when looking back at their own life, realise that the most memorable times were when they misbehaved and got away unpunished. What should one teach one's children?

The Multiparticle Dynamics Symposia have been a part of Life. We are fortunate that we can control and chose some aspects of our lives - combining the useful and the enjoyable.

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