April 30, 1968

India Department of Atomic Energy, Press Release, 'India and the USSR Sign Protocol for Collaboration in the Peaceful Uses of Atomic Energy.

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Summary:

A press release from the Indian Department of Atomic Energy announcing that the Soviet Union would be sending a delegation of scientists to India and summarizes the history of nuclear assistance from the Soviet Union.

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Department of Atomic Energy
Publicity Division
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Apollo Pier Road
Bombay.1.

May 1, 1963.

A press release dated April 30, 1963 issued in connection with the signing of protocal for collaboration in the peaceful uses of Atomic Energy between India & USSR is sent herewith for information.

(R.S. Raj)
Asstt. Administrative Officer
for Head, Publicity Division.

Director's Office, BARC
Directors of Group, BARC
TAPP
RAPP
MAPP
Director, TIFR

PRESS RELEASE
PR-18

Government of India
Department of Atomic Energy
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BOMBAY : APRIL 30, 1968

INDIA AND THE USSR SIGN PROTOCOL FOR COLLABORATION IN THE PEACEFUL USES OF ATOMIC ENERGY

Dr. I.D. Morokhov, Deputy Chairman of the USSR State Committee on the Use of Atomic Energy, and Dr. Vikram Sarabhai, Chairman, Indian Atomic Energy Commission, signed today a protocol to activate collaboration between the Atomic Energy Authorities of the two countries for cooperation covering a wide range of activities in the application of the peaceful uses of atomic energy. Dr. Morokhov is leading a delegation of distinguished Soviet scientists specialised in the various fields of atomic energy. The delegation is in India at the invitation of the Indian Atomic Energy Commission and during the past two weeks has spent time at the Bhabha Atomic Research Centre, Trombay, the various other establishments of the Atomic Energy Commission in Bombay, Tarapur, Jaduguda, Mangal, Madras and Hyderabad.

The present visit follows on the visit of Dr. Sarabhai to the Soviet Union early in 1967 when plans were laid for visits of scientific teams from both sides to identify areas of collaboration. In pursuance of this, two groups from the Indian Atomic Energy Commission have visited the Soviet Union during the past six months. One has covered the field of reactors and generation of power using atomic energy. The other has dealt with production and use of radio-isotopes in industry, agriculture and medicine. Two other groups will visit the Soviet Union to study the areas of common interest in nuclear, high energy and solid state physics, and another in biological sciences. Soviet teams are expected to visit India for further discussions later this year.

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S/A

With reference to Secretary's query on Dr Ranganathan's D.O. letter of 9th October, 1968, I saw Prof. Menon, Director, TIFR. Prof. Yash Pal was also consulted by Prof. Menon. The position is that at no stage did the Tata Institute send the note on "Possibilities of collaborating with USSR in the Field of Experimental High Energy Physics". Prof. Yash Pal and Prof. Udgaonkar had, however, prepared the note and Prof. Yash Pal had given it informally to Dr Nag Chaudhuri during one of his visits to TIFR. This is because Dr Nag Chaudhuri was aware of the fact that the Department of Atomic Energy had deputed a Physics Group to USSR and that certain suggestions had been made for collaboration with USSR in the field of Experimental High Energy Physics. According to Prof. Yash Pal it was never intended that the note should be discussed by the Planning Commission as this was purely for Dr Nag Chaudhuri's own information as a scientist. Prof. Menon is of the view that we may inform Dr Ranganathan, Chief (Science), Planning Commission that proposals for collaboration between India and USSR in the peaceful uses of atomic energy will be considered by the Department of Atomic Energy who would take necessary action and that ~~meme~~ the Ministry of Education or any other ministry is not concerned. A note giving the status of our collaboration with USSR is being submitted to Secretary separately.

(Y.S. Das)
30. 11. 1968

Secretary MAV. may please with a suitable letter to Dr Ranganathan and show me the draft.

18/12

I am sorry for the very great delay in replying to your letter No. 3/5/68-RSR dated October 9, 1968. In relation to the summary records of the meeting of the Panel on Mathematics, Physics, Astrophysics and Nuclear Physics, which met on the 23rd of September 1968, I have the following comments to make.

1. In the field of Astronomy, apart from the Delhi and Osmania Universities, the following institutions are active.

i) The Astrophysical Observatory, Kodaikanal - Director: Dr.M.K.Vainu Bappu.

ii) The Ooty Radio Telescope Project of the Department of Atomic Energy, under the charge of TIFR - Professor G.Swarup.

iii) The Solar Radio Astronomy Group at the Physical Research Laboratory, Ahmedabad, under the charge of Dr.R.V.Bhosle.

2. In the group II(a) relating to Solid State Physics, it would be appropriate to have the name of

Moreover, under III relating to Nuclear Physics, it would be appropriate to have the name of

3. The note forwarded by Professor Yash Pal and Professor Udgaonkar arose out of the visit arranged by the Department of Atomic Energy of 4 scientists to the USSR in under the collaborative agreement with the State Committee on the Peaceful Uses of Atomic Energy and the Department of Atomic Energy. Collaboration involving the State Committee of the USSR is being renewed by this Department.

With best regards,

Yours sincerely,

Serial No.

File No.

Draft Letter / Memorandum / Telegram

1. Date of despatch

2. List of enclosures

No. Dated

Dear Dr Ranganathan,

Kindly refer to your D.O. letter No.3/5/68-RSR dated October 9, 1968, addressed to Dr Sarabhai regarding the meeting of the Panel on Mathematics, Physics, Astrophysics and Nuclear Physics, set up in special meeting of Indian Members of Indo-Soviet Joint Committee for Scientific Cooperation held on 23rd September 1968 in New Delhi. We regret the delay in acknowledging your letter. Dr Sarabhai has asked me to inform you that he has taken note of the summary record of the meeting. Proposals for collaboration between India and the Soviet Union in the peaceful uses of atomic energy will be considered by this Department and all necessary action in the implementation of these proposals will be taken by this Department.

Yours sincerely,

(M.A. Vellodi)

Dr V. Ranganathan
Chief (Science)
Planning Commission
New Delhi.

Dated 9th October, 1968

Dear Dr. Sarabhai,

Kindly refer to the Planning Commission U.O.No.3/5/68-RSR dated 16.9.68 regarding meeting of Panel on Mathematics, Physics, Astronomy & Nuclear Physics, set up in special meeting of Indian Members of Indo-Soviet Joint Committee for Scientific Cooperation, to be held on 23rd September 1968 in Yojana Bhavan, New Delhi.

A copy of the summary record of the above meeting is sent herewith for necessary action at your end, ~~so far as the areas in which you are concerned.~~ in respect of them.

In this connection a copy of note, on "Possibilities of collaborating with USSR in the Field of Experimental High Energy Physics", received from Tata Institute of Fundamental Research, is also enclosed.

With kind regards,

Yours sincerely,

(V. Krishnamurthy)

Dr. V.A. Sarabhai,
Chairman,
Atomic Energy Commission, Bombay
c/o Deptt. of Atomic Energy,
South Block,
New Delhi.

(c)	Low Temp. Physics	
(viii)	Dr. M.S.R. Chari	National Physical Laboratory, New Delhi.
(d)	Instrumentation	
(ix)	Dr. M. Ramakrishna Rao	Senior Scientific Officer, Indian Institute of Science, Bangalore.
(x)	Shri S.K. Suri	National Physical Laboratory, New Delhi.
(xi)	Dr. C. Ambasankaran	Bhabha Atomic Research Centre, Trombay
(xii)	Dr. P.S. Gill	Central Scientific Instrument Organisation, Chandigarh
(xiii)	Dr. R. Roy	Saha Institute of Nuclear Physics, Calcutta.
(e)	High Voltage Engineering	
(xiv)	Dr. H.V. Gopalakrishna	Prof. Indian Institute of Science, Bangalore.
(f)	Physics of Large Molecules	
(xv)	Dr. G.N. Ramachandran	Prof. Madras University
III.	Nuclear Physics:	
(i)	Dr. R. Ramanna	Head, Physics Unit, Bhabha Atomic Research Centre, Trombay.
(ii)	Dr. P.K. Iyengar	Bhabha Atomic Research Centre, Trombay.
(iii)	Dr. D.N. Kundu	Director (Acting) and Head of the Accelerator Group, Saha Institute of Nuclear Physics, Calcutta.
(iv)	Dr. H.S. Hans	Prof. and Head of the Deptt. of Physics, Punjab University, Punjab.
(v)	Dr. A.P. Patro	Professor of Nuclear Physics, Saha Institute of Nuclear Physics, Calcutta.

TIFR.

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could also be made for exposures in their own bubble chambers. They pointed out that even though at the moment there is no space available for a $\bar{\Sigma}$ neutral particle beam, if a proposal for the purpose from India is accepted, such a beam may be built in a year or two from now. It was generally agreed that experimental colloboration can be carried out profitably only if India is prepared to keep a team of a few scientific workers permanently at Serpukhov; members of this teamwould, of course, be changed every year or so. They pointed out that such pooposals for experiment should be sent simultaneously to the Director of Cerpukhov and to the Russian State Committee for peaceful uses of Atomic Energy.

(ii) Academician Fedorenko of the Yoffe Institute, Leningrad indicated, during his discussion with Dr. B.D. Nag Chaudhuri, that they would be willing to collaborate with Indian workers in the following specific field:-

a) Neutrino Experiment of Tata Institute of Fundamental Research at Kolar (Prof. Budker of the Institute of Nuclear Phsics, Academy Gorodok, Novosibirsk also expressed an enthusiastic interest in a possible large scale colloboration on these experiments involving significant investment on their part) DAE.

(b) The Baloon Experiment by the Tata Institute of Fundamental Research at low altitude with instrumentation provided by Yoffee Institute. DAE

(c) Sputtering and atomic collision studies carried out at Saha Institute of Nuclear Physics.

(d) Coulomb Excitation Experiment and nuclear spectroscopy carried out at the Saha Institute and Tata Institute of Fundamental Research. DAE.

It was suggested that details of the programme with financial estimates etc. for the specific proposals on the above lines, after further discussions with Russian Scientists if necessary, should be worked out by the Tata Institute of Fundamental Research and Saha Institute of Nuclear Physics in areas of their concern, and should be sent to the Ministry of Education for further action.

By special messenger

PLANNING COMMISSION
(S.R. SECTION)
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Kindly refer to Planning Commission U.O. No. 3/5/68-RSR dated 16th September, 1968 regarding meeting of the Panel on Mathematics, Physics, Astrophysics and Nuclear Physics, set up in the special meeting of the Indian Members of the Indo-Soviet Joint Committee, to be held on Monday 23rd September, 1968, at 3.00 P.M. in Room No. 107, Yojana Bhavan, New Delhi.

A copy of the Agenda for the meeting with Agenda Note is sent herewith.

Hiralal
23.9.68
(Hira Lal)
Research Officer

Members of the Panel

1. Dr. D.S. Kothari,
   Chairman,
   University Grants Commission,
   Bahadur Shah Zafar Marg,
   New Delhi.1.

2. Dr. V.A. Sarabhai,
   Chairman,
   Atomic Energy Commission,
   C/o Deptt of Atomic Energy,
   South Block, New Delhi.

3. Dr. S. Dhawan,
   Director, Indian Institute of
   Sciences, Bangalore.

4. Dr. V.S. Hazur Bazar,
   Professor and Head of the
   Department of Mathematics and Statistics,
   University of Poona, Poona-7.

Planning Commission u.o.No. 3/5/68-RSR dated 19.9.1968.

Copy to Member(Science)

Agenda for meeting of Panel on Mathematics,Physics, Astrophysics and Nuclear Physics, set up in a special meeting of Indian Members of Indo-Soviet Joint Committee for scientific cooperation, to be held on Monday 23rd September 1968 at 3 P.M. in Room No.107, Yojana Bhavan,New Delhi.

I. Formulation of cooperative projects which could be taken up in the above areas and preparation of project details with financial estimates - a note on this is enclosed.

formulation of cooperative projects which should
be taken up in the fields of Mathematics, Physics,
Astrophysics and Nuclear Physics and preparation
of project details with financial estimates.

Indo - USSR Joint Committee for Scientific Cooperation identified, along with other areas, the following fields for scientific cooperation between India and USSR and recommended that detailed projects should be formulated by the joint panel of experts.

i) Mathematics
ii) Physics
iii) Astrophysics
iv) and Nuclear Physics

2. In mathematics and theoretical sciences, considerable amount of research work is in progress in Indian Universities and other institutes. For example in the field of Astrophysics fairly good facilities are available at the Astrophysical Laboratory at Kodaikanal. These facilities could be used by the Russian Scientists. We may on a similar basis seek cooperation in respect of some clearly identified projects in the following specific subject fields already indicated by the Joint Committee;

i)	Mathematics:	Fundamental research of Modern Mathematics - probability theory, stochastic process, information theory, topology, group theory, differential equations and numerical analysis.
ii)	Solid State Physics.	Semiconductor Physics, Superconductivity.
iii)	Electronics	Surface Phenomenon, Plasma Physics.
iv)	Astrophysics	Cosmic Rays, Neutrino-stellar structure, General relativity.
v)	Nuclear Physics:	Nuclear spectroscopy (coulomos Excitation etc)
vi)	Instrumentation	
vii)	Atomic and Molecular spectroscopy.	

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3. The cooperation envisaged can be from institute to Institute or in the form of a joint team consisting of scientists from both the countries working on a particular problems for a period of about 2 years in selected Institut in both the countries or there can be a programme of visiti scientists from each of the two countries to selected Institutes. As regards the later it would be essential to lay the criteria for selection of institutions, level of scientists, the Institute of Scientists etc.

4. Suitable Universities, laboratories of the C.S.I.R. and other research institutes could also be asked to suggest project from their side, if any, on the above lines with full details (according to draft proforma ttached as Appendix) as follows:-

i) Specific programmes indicating method of cooperation - institute to institute or joint teams.

ii) Particular projects for which the University or the research institute would like to seek the cooperation of the Russian Scientists.

5. The Ministry of Finance has suggested that necessary financial provision required for such projects should be assured in the fourth five year plan and accordingly the financial estimates should be adjusted within the fourth plan allocation to C.S.I.R, U.G.C. and other agencies as the case may be.

HOMI BHABHA ROAD, BOMBAY - 5.

Possibilities of Collaborating with U.S.S.R. in the Field of Experimental High Energy Physics.

In this note we will summarise in some details the possibilities of collaborating with Soviet scientists in the field of experimental high energy physics.

1. The High Energy Accelerator Laboratory at Serpukhov:

(a) The Accelerator: The 75 GeV Serpukhov accelerator is now working. It is quite an elegant machine built on the strong focusing principle. The injector of the machine is a 100 mev linear accelerator. The accelerator has already achieved an intensity of 3×10^{11} particles per pulse, the repetition rate being one every 5 sec. It is hoped to increase the intensity to 10^{12} protons per pulse quite soon.

The experimental hall is enormous and already rather cluttered. Several beams were being prepared for the first experiments which were supposed to start around July.

The CERN and the French groups have signed agreements for specific rights and responsibilities at Serpukov. For example

1. The ejector for the total beam is being designed and built by CERN. Some work on this is also being done at Leningrad.

2. The secondary beam separator is being set up in collaboration with the French and CERN groups.

3. CERN people are also collaborating in working out the design of a neutrino horn; however, neutrino beams may not materialise before 1971-72.

4. The French are building a large bubble chamber, the Mirabelle, which will come to Serpukhov around 1970 along with a

(e) Several large bubble chambers including the Mirabelle will be exposed to the separated particle beams of high energy. These experiments will not start before 1970.

(f) A 200 tons sparkchamber is being built to be used for th possible neutrino experiment to be done in the future.

(g) Spark chamber spectrometers are being built which will be ready by the middle of next year.

(h) A neutral beam at 20 to 30 mrad is being build in order to study K regeneration at high momenta. It is hoped to separate the electron regeneration of K^0_S in an attempt to measure the electromagnetic radius of K^0.

(i) A collaboration of socialist countries was ready to expose a nuclear emulsion stack to the 70 GeV proton beam.

III. Specific possibilities for collaboration:

We had discussion with Dr. Lugonov, the Director of Serpukhov and, in greater detail, with Dr. Dri Prokoshkin, who is the head of the experimental group.

Dr. Prokoshkin's general attitude was quite positive after he had been convinced that ours was not just a cultural visit. He pointed out that the possibility of collaboration in any experimental projects for which they have entered into specific agreements with CERN or the French groups may be limited unless we simultaneously come to an agreement with these two outside groups. However, there were experiments including some bubble chamber experiments which were entirely their own and, on these, they would welcome the participation of Indian Scientists.

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(e) Several large bubble chambers including the Mirabelle will be exposed to the separated particle beams of high energy. These experiments will not start before 1970.

(f) A 200 tons sparkchamber is being built to be used for th possible neutrino experiment to be done in the future.

(g) Spark chamber spectrometers are being built which will be ready by the middle of next year.

(h) A neutral beam at 20 ϕ to 30 mrad is being build in order to study K regeneration at high momenta. It is hoped to separate the electron regeneration of K^0_S in an attempt to measure the electromagnetic radius of K^0.

(i) A collaboration of socialist countries was ready to expose a nuclear emulsion stack to the 76 BeV proton beam.

III. Specific possibilities for collaboration:

We had discussion with Dr. Lugonov, the Director of Serpukhov and, in greater detail, with Dr. Dri Prokoshkin, who is the head of the experimental group.

Dr. Prokoshkin's general attitude was quite positive after he had been convinced that ours was not just a cultural visit. He pointed out that the possibility of collaboration in any experimental projects for which they have entered into specific agreements with CERN or the French groups may be limited unless we simultaneously come to an agreement with these two outside groups. However, there were experiments including some bubble chamber experiments which were entirely their own and, on these, they would welcome the participation of Indian Scientists.

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For example, Dr. Prokoshin indicated that if a bright young physicist wanted to collaborate with him on the elastic scattering experiment to be done next year, he would welcome such a possibility. Specific proposals could also be made for exposures in their own bubble chambers. We also raised the question of initiating collaborative counter experiments, for example, a study of the inelastic cross-section for neutrons of upto 75 MeV using a total absorption calorimeter. It was pointed out that even though at the moment there is no space available for a 0° neutral particle beam, if our proposal is accepted by the Scientific Committee, such a beam may be built in a year or two from now. It was generally agreed that experimental collaboration can be carried out profitably only if we are prepared to keep a team of a few scientific workers permanently at Serpukhov; members of this team would, of course, be changed every year or s

Most of these discussions were informal and there was no commitment of any sort. It was pointed out to us that the proposals for experiments should be sent simultaneously to the Director of Serpukhov, to the scientists concerned (Dr. Prokoshin, in this case) and to the State Committee for Peaceful Uses of Atomic Energy. Including the State Committee in all the correspondence seems to be absolutely impertive.

IV. Collaboration with the Dubna High Energy Physics Group for work at Serpukhov or at Dubna:

In Dubna we had prolonged discussions with Dr. A.I.Khrinkevitch, who is one of the present Vice-Directors of Dubna, and Dr. Oneillo, who is the head of the high energy physics laboratory at Dubna. Attitude of these scientists was extremely cooperativ

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and positive. Dubna is going to play a major role in the utilisation and maxx of the Cerpukhov facilities. Their two-meter propane bubble chamber was to be moved to Cerpukhov around June for an exposure to the negative particle beam of momentum 20 to 40 GeV/c. They are also responsible for the small angle proton-proton scattering experiment at Cerpukhov as also for the K^0 regeneration experiment.

In addition to their participation in the Cerpukhov programme, the Dubna group aims to increase the utilisation of the 10 GeV machine at Dubna. Several interesting experiments planned for this machine were discussed. We were also told that nearly 300,000 pictures of a 4 GeV/c π^- in a 50 cm. propane bubble chamber might be available if we make a proposal for their utilisation. Some ~~piccc~~ pictures of π^+ in Xenon chamber might also be available.

In Dubna we also made contct with Drs. K.D. Tolstov and J. Sykicki, who are responsible for coordinating nuckear emulsion exposures at Cerpukhov. We were assured that our proposasls for exposure could be included in the general programme. -/- Actually they requested us to suggest meaningful nuclear emulstion exeriments so that their own case for demanding such exposures is strengthened. Both proton and negative particle exposures are being planned. Again the method of operation would be to write simultaneoulsy to these members of the emulsion committee, to the Director of Dubana and to the Director of Cerpukhov (and most probably also to the State Committee for Peaceful Uses of Atomic Energy).

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As has already been mentioned in the main body of this report, Dubna being an international institute would welcome our participation and collaboration. In fact they were a little unhappy that we have not utilised any of the fellowships available to Indians for working at Dubna. There was also some informal discussion of our being associated with Dubna not only as guests but as participating members.

V. Future possibilities of collaboration with the Institute of Nuclear Physics, Academy Gorodok, Novesibirsk:

This Institute, under Prof. Budker, is concertaining on building colliding beam accelerators and they have already started doing some experiments involving the production of ρ and ϕ mesons in electron positron collisions. Prof. Budker expressed a great enthusiasm for collaboration. However, he indicated that they would not be in a position to welcome young Indian workers for the next couple of years. On the other hand, he was quite favourable to discussing possibilities of large scale participation by us in their programmes. After one of us gave a talk on the high energy cosmic-ray neutrino experiment being done in Kolar, Prof. Budker expressed an enthusiastic interst in a possible large scale collaboration on these experiments involving significant investment on their part; he felt that the outcome of these experiments may help them to decide on the future programme of accelerator development. We were greatly impressed by Prof. Budker's Institute and his forward-looking attitude towards developing science.

Yash Pal

B.M. Udgaonkar