верситетом Лаваля, г. Квебек (Канада).
По ряду международных контрактов лаборатории института интроскопии выполняют исследования совместно с другими подразделениями Томского политехнического университета. Так, работа по исследованию фотонейтронного источника на базе бетатрона с энергией 10 МэВ ,выполняемого по заказу Оук-Риджской Национальной лаборатории (США), была осуществлена совместно с лабораторией НИИ ядерной физики. Работы по исследованию электромагнитной эмиссии, выполнявшиеся по заказу Фраунгоферовского института (г. Саарбрюккен, Германия), проходили совместно с лабораторией ЭДИП ТПУ.
В рамках международного научного сотрудничества ежегодно 3-5 сотрудников института проводят совместные научные исследования за рубежом.

В. Л. Чахлов,
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The international cooperation plays a substantional role in the structure of reasearch - industrial orders which are carried out by the institute. Forms of the international cooperation are various: joint manufacture of the devices, designed in the institute, researches by the order of foreign firms; participation in international grants.
The largest part in international cooperation form works concerning development, delivery and investigations of small-sized betatrons.
Developed in Tomsk polytechnical institute portable small-sized betatron on energy of 6 MeV (ПМБ-6), intended for the indestructing control in non-stationary conditions of building structures and welded joints with equivalent thickness on steel up to 200 mm. After exhibiting at Leipzig International fair in 1968 the betatron has gained attention of some of foreign firms. During 1968-1972 through the Foreign trade association "Tekhsnabexport" betatrons ПМБ-6, which were produced together with a Tomsk instrument factory, were sold in France, Finland, GDR, Poland, Czechoslovakia and other countries.
The new model of small-sized betatron on energy 4 MeV (МИБ-4) also has interested foreign firms, and through "Tekhsnabexport" the deliveries of these installations in Italy, Bulgaria, China were carried out. However the wide export was hindered by absence of warranty and maintenance service of sold betatrons. After analysing the situation together with representatives of "Tekhsnabexport", there was made a decision about the necessity to cooperate with a firm-intermediator. After negotiation with prospective firm-intermediators in Germany and Great Britain, in 1986 the contract with firm JME Ltd. (Luistoft, Great Britain) about joint manufacture of small-sized betatrons was made . By then a new small-sized pulse betatron on energy 6 MeV (МИБ-6) was developed . And this betatron as well as МИБ-4 was to be advertised and produced jointly. In the beginning of the work the decision was made to use Western electronic components in the manufacture of betatrons. The Russian party had undertaken the manufacture of the most complex elements of the betatrons: emitter with accelerating chamber, and the firm JME - the manufacture of control desk and supply unit from our drawings , besides the firm has

undertaken to carry out maintenance service of sold betatrons. The returns were gone fifty-fifty between the firm and the institute. Betatrons were jointly manufactured and sold into Great Britain, USA, Italy, Sweden, India and other countries.

In recent years relations with the firm JME were enlarged by joint research work. So, in 1996 at the expense of the firm and the institute the new model of betatron on energy 7,5 MeV (МИВ-7,5) was developed.

Together with the firm JME two new accelerators МИБ-7,5 are already put on Western market.

In 1994 the institute together with the firm JME has won a grant on the program "Intas" on development of a tiny source of electron beams for radiotherapy. The prototype of betatron on 10 MeV with the extracted electron beam, developed and manufactured on this grant, is delivered to Уолсгрейвский hospital (Coventry, Great Britain) for testing.

Nowadays institute together with the firm JME carries out the investigation by the order of Los Alamos of National laboratory (USA) on creation betatron on 9 MeV.

For promotion of small-sized betatrons into Chinese market the Institute of introscopy has made the agreement on cooperation with a factory of devices of non-destroying control Dandung. Nowadays through the factory a betatron МИБ-6 and a betatron МИБ-4 are sold in China According to the agreement this factory is also advertising other devices developed in institute. One model of acoustic leak detector is bought by a factory.

With the North-Chinese institute of technologies (Taiyuan, China) there is made the contract on manufacture and delivery of the roentgeno-television introscop with the computer software developed in the Institute of introscopy. Alongside with the contracts, providing delivery and manufacture of devices, the institute carries out the joint projects on thermal methods of the control with Fraungover institute of non-destroying tests (Saarbruecken, Germany); with the department of the non-destroying control of Lawrence National laboratory (Livermore, USA), with the Institute of refrigerating engineering (Padua, Italy); with Laval university (Quebec,Canada).

A number of the international contracts laboratories of the Institute introscopy carry out together with other divisions of Tomsk polytechnical university. So the work on investigation of a photoneutron source on the basis of betatron with energy of 10 MeV, carried out by the order of Oakridge of National laboratory (USA), was conducted together with a laboratory of the Research institute of nuclear physics.

The works on study of electromagnetic emission, carried out by the order of Fraungover institute (Saarbruecken, Germany), were conducted together with TPU laboratory of ЭДИП .

Within the framework of international scientific cooperation annually 3-5 employees of the institute conduct joint joint scientific researches abroad.

V.L. Chakhlov,
Director
of Research institute of introscopy

Tomsk betatrons: working for export