

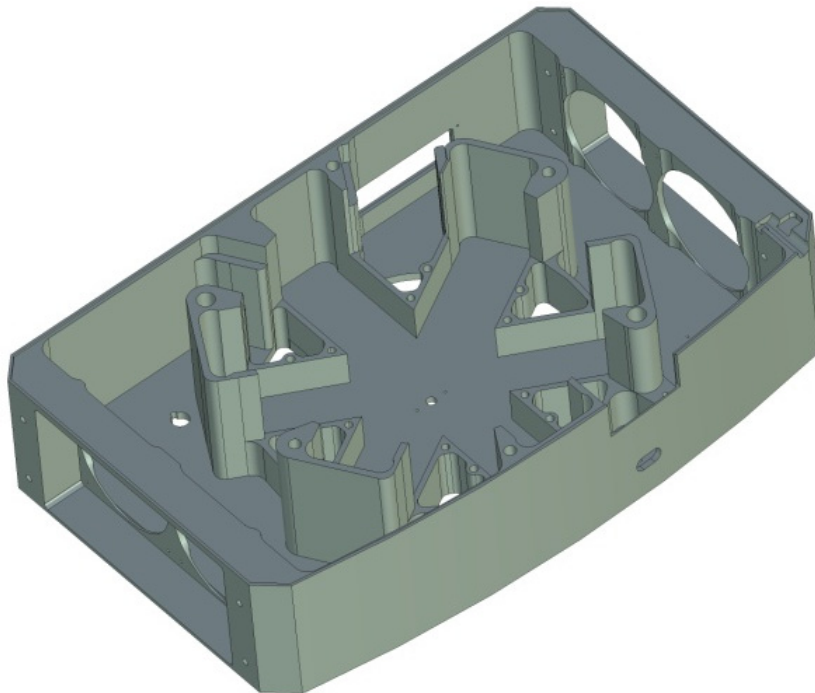
## **Design of the betatron body**

The betatron – the accelerator of charged particles taking a special place among numerous types of accelerators of the charged particles applied in the practical and scientific purposes. In the betatron for acceleration of electrons on the circular use the electric field induced by the magnetic flux changing in time, other accelerators use principle of action resonant. The movement of particles and impact on them of the accelerating field are strictly synchronized.

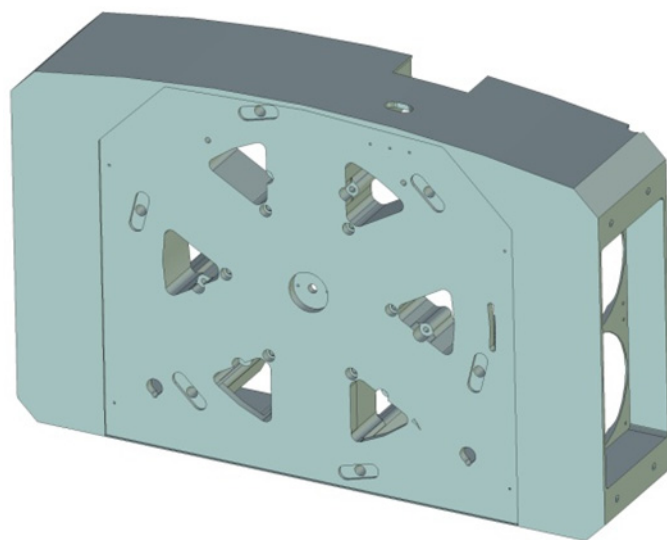
Development of small-sized betatrons is capable to replace x-ray devices.

Advantage of small-sized betatrons in front of x-ray devices consists in higher power of a dose of braking radiation. The betatron demands smaller costs of creation of biological protection for the personnel and people around because in the switched-off state it as the source of radiation doesn't constitute danger. Small-sized betatrons improve in two directions: reduction of the dimension of installation and increase in intensity of radiation [1].

Project works at creation of every product, including bodies of the betatron having a difficult geometric form take a long time, are involving in design engineers of different specialties. Application of modern powerful tools of the computer equipment and the special software leads to considerable reduction of time, spent for project works and, as a result, reduce labor input of these works. Use of computer aided design systems (CAD-systems) allows not only to receive a set of design documentation, but also to carry out virtual tests that also reduce costs of production of prototypes. For this purpose the 3D model becomes. The 3D model of the lower part of betatron body options is given in fig. 1 and 2. Creation of such 3D model – a labor-consuming task, but it gives indisputable advantages at design. On the basis of a 3D model release of a set of design documentation, development of technological processing is possible, and also this model can form a basis for automatic generation of the operating program for the machine with numerical control (CNC) for the purpose of further production.



*Fig. 1. 3D model of the lower part of the case of the betatron (inside)*



*Fig. 2. 3D model of the lower part of the case of the betatron (outer side)*

### **References**

1. В.А. Москалев, Г.И. Сергеев. Индукционный ускоритель электронов – бетатрон. – Томск: изд-во НИ ТПУ, 2012. – 312 с.

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