

Compact Pulsed Accelerator ARSA for Application in Medicine and Biology,
S.L. EHL'YASH, N.I. KALINOVSKAYA, RFNC-VNIIEF - VNIIEF has developed and successfully applied in physics research a small-size pulsed accelerator ARSA built upon a ten-cascade Marx generator of 1 MV voltage. An essential feature of the Marx generator is pulse charging of capacitors. Current switching is provided by high-pressure spark gaps. The accelerating tube which is a cold-cathode sealed vacuum diode serves as source of electron or X-ray pulses. The dose at the output window is $3 \cdot 10^4$ Gy and 3 Gy, respectively, in a 10 ns shot. A blade-type cathode provides both uniform current density and radiation field. The high-voltage unit is about 50 kg weight. The ARSA accelerator incorporates a package of measurement equipment to obtain the required information on radiation fields. Stability in performance, small size, low cost, environmental safety together with the capability of Monte-Carlo calculation of energy deposition in any irradiated sample – all these make the device applicable in health research and clinics. The small-size bilateral X-ray irradiator using the ARSA accelerator can be useful for donor blood irradiation to prevent the secondary “graft-versus-host” disease due to bone marrow transplantation.