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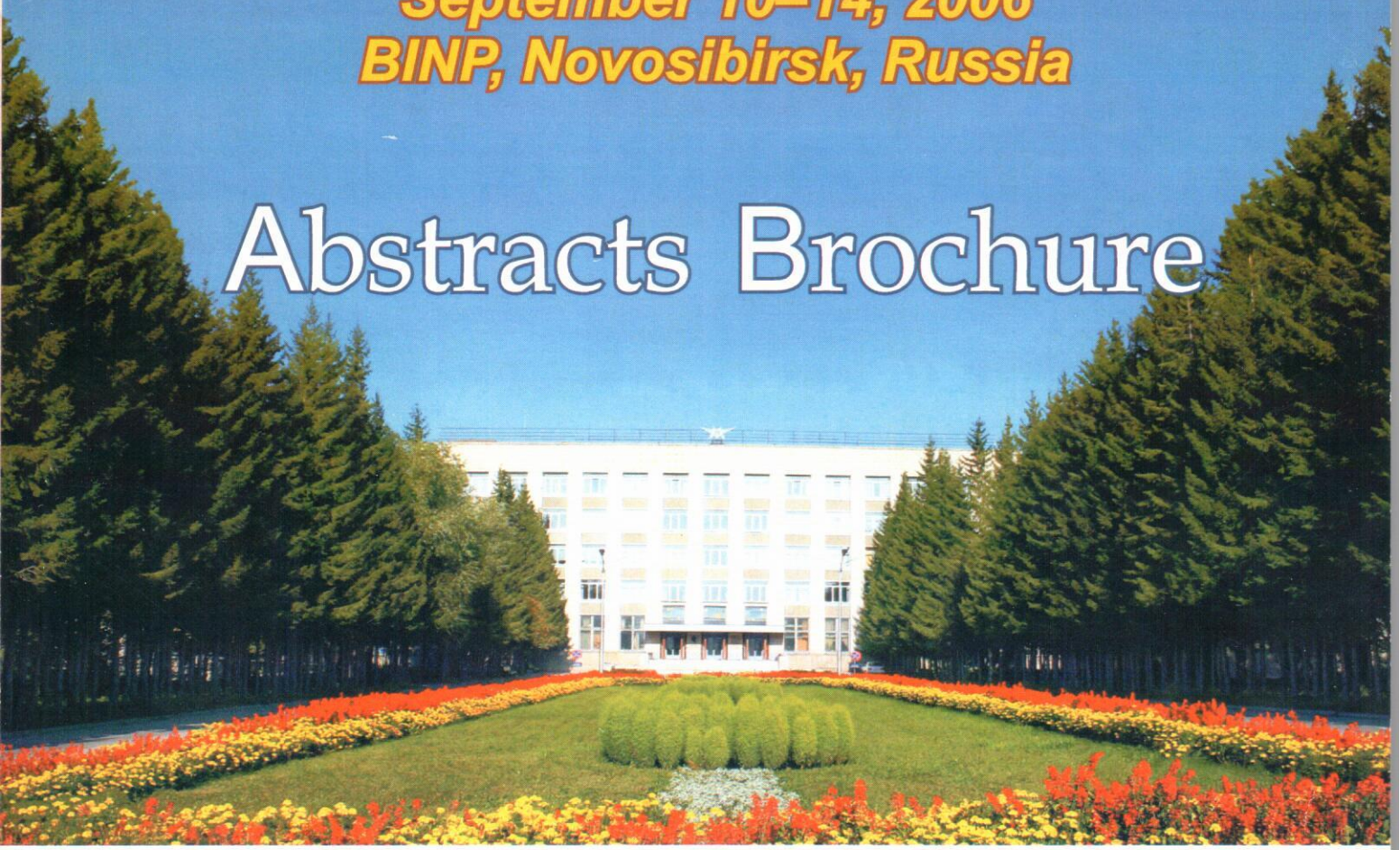

Abstracts Brochure

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Screening of injection channels for superconducting cyclotron C400

Possibility to use 2D model for preliminary choice of shielding is discussed. The comparison with real 3D geometry is done. Results of simulations of the 12C6+, 2H+ and 4He2+ ion beam injection are presented.

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Neutron producing target for accelerator based neutron capture therapy

Pilot innovative accelerator based neutron source for neutron capture therapy of cancer is now on the threshold of its operation at the BINP. One of the main elements of the facility is lithium target producing neutrons via threshold 7Li(p,n)7Be reaction at 25 kW proton beam with energies 1.915 MeV or 2.5 MeV. In the present report, choice of target was substantiated. The main problems of lithium target were determined to be: 7Be radioactive isotope activation, keeping lithium layer solid, presence of photons resulted from proton inelastic scattering on lithium nuclei, and radiation blistering. The results of thermal testing of target prototype, investigations of radiation blistering, lithium evaporation and results of simulations are presented. It becomes clear that water is preferable for cooling this target, and that the lithium target 10 cm in diameter is able to run up to 25 kW proton beam before melting. In the report, the conception of optimal target is proposed: thin metal disk 10 cm in diameter easy for detaching, with evaporated thin layer of pure lithium from the side of proton beam exposure, its back being intensively cooled with turbulent water flow to maintain lithium layer solid. Design of target for the neutron source constructed at BINP is shown. Conceptions of moderator for epithermal neutron beam obtaining, radiation protection and diagnostics of neutrons, gamma-rays and alfa-particles are presented also.

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