

# Accelerator-Based Boron Neutron Capture Therapy

Paolo Colautti LNL-INFN, viale dell'Università 2, Legnaro, Italy

Boron neutron capture therapy (BNCT) is a dual therapy. First a  $^{10}\text{B}$  carrier, with high tumour-cell specificity, is locally, or through the circulatory system, injected into the patient. When the tumour/healthy-tissue  $^{10}\text{B}$ -concentration ratio has reached the maximum value, the tumour region is irradiated with thermal neutrons, which induce exothermic nuclear reactions in  $^{10}\text{B}$  nuclei. Because of the short range of the high-LET nuclear reaction fragments, about 80,000 ionisation events take place only inside the  $^{10}\text{B}$ -doped living cells, giving rise to severe biological damage. BNCT needs large quantity of thermal neutrons, which only nuclear reactors can supply so far. However, hardly a nuclear reactor could be constructed inside a medical centre. Therefore, low-energy high-intensity particle accelerators for BNCT have been conceived and constructed since the 1980s. The talk will give a short overview of the BNCT method, together with the status of art of BNCT in the world and the advances of accelerator-based neutron sources for BNCT.