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Nuclear Physics and Cancer Treatment: Recent Advances RUPRECHT MACHLEIDT, University of Idaho — Exactly 100 years ago, the "Bragg Peak" was discovered. The ionization caused by alpha particles in matter shows a characteristic peak at the end of the particles' trajectories. In 1946, the nuclear physicist Wilson suggested to use beams of heavy charged particles for the treatment of localized tumors. The Bragg peak can be focused on the tumor and, thus, little damage is done to the surrounding healthy tissue. In this way, the occurence of negative side effects from a radiation treatment is substantially reduced as compared to conventional radiation therapy which uses X-ray. Today, we have 40 years of experience in the treatment of cancer by beams of protons and heavy ions. A recently published 10-year follow-up study has proven that the cure rate of proton therapy is as good (or even better) as with 'conventional' treatment protocolls but the rate of side effects is by up to an order of magnitude smaller. This makes proton (and heavy ion) therapy clearly suprior to other forms of radiation therapy. Unfortunately, this fact is little known even by some oncologists.

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