A new idea “nugget” from FOCUS:

**Nuclear activation with high-energy protons**

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The production of radioactive isotopes with a laser may have applications in Positron Emission Tomography (PET) to study functioning of different organs of the human body and diagnose diseases such as cancer in their early stages. We performed experiments on nuclear activation of $^{11}$B and $^{63}$Cu samples with high-energy protons. In situ measurements of the induced radioactivity shows 511 keV annihilation gamma-rays, from which we infer production of $\sim 10^5$ atoms of $^{11}$C and $^{63}$Zn.

Fig. 3 (a) Setup for activation with protons. A collimator and shield were introduced to prevent saturation of the detection system due to high-energy electrons and gammas during the laser shot. (b) Spectrum of proton irradiated $^{11}$B sample. (c) and (d) Radioactive decay signals of proton irradiated $^{11}$B and $^{63}$Cu samples (dots). Solid lines correspond to the decay of $^{11}$C and $^{63}$Zn with half-life of 20 and 38 minutes, correspondingly.