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Laser-enhanced aerodynamic isotope separation for making medical radio-isotopes

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Abstract: Aerodynamic isotope separation in a free gas jet is enhanced by 2 orders of magnitude by laser-induced isotopically selective condensation. The method is quite generally applicable and is demonstrated for separating S, Br and Si isotopes. The separation of Mo isotopes is discussed in detail for the production of ^{100}Mo for the $^{100}\text{Mo}(p,2n)^{99}\text{Mo}$ reaction and the production of $^{99\text{m}}\text{Tc}$ for SPECT. Other possibilities including the enrichment of ^{44}Ca from 2% natural abundance, to more than 90%, for PET scanning via $^{44}\text{Ca}(p,n)^{44}\text{Sc}$ are discussed, where β^+ of ^{44}Sc has a half life of 4h.

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