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Charge Breeding of CO^+ Beams at REX-ISOLDE

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In a theranostic approach in hadron therapy, the β^+ emitter ^{11}C can be used as the therapeutic beam and for range verification via PET imaging at the same time. Within the MEDICIS-PROMED project we study a possible injection scheme of the radioactive beam into the synchrotron-based medical accelerator. In this approach, ^{11}CO is produced with the on-line isotope mass separation technique followed by a beam preparation stage based on an Electron Beam Ion Source (EBIS).

Through tests at REX-ISOLDE with REXEBIS and the cooler/buncher REXTRAP the limitations of CO charge breeding can be explored with stable, high-intensity $^{13}\text{CO}^+$ ion beams. Possible charge breeding schemes and recent measurement results concerning beam transmission, charge breeding efficiencies and studies of molecular break-up in REXEBIS and REXTRAP are presented.

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